

APPLIANCE TECHNICAL GUIDE

FOR THE COMPLETE i-BOILER RANGE



SERVICE ENGINEER EDITION (SERIES 3 - 2023 ONWARDS)



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Appliances covered

MODEL	GC NUMBER
i24C Combination Boiler	47-570-02
i28C Combination Boiler	47-570-03
i36C Combination Boiler	47-570-04
i40C Combination Boiler	47-570-05
iC Economiser 27 Plus Combination Boiler	47-570-06
iC Economiser 35 Plus Combination Boiler	47-570-07
iC Economiser 39 Plus Combination Boiler	47-570-08
i15S System Boiler	41-570-09
i18S System Boiler	41-570-10
i24S System Boiler	41-570-11
i32S System Boiler	41-570-12
i40S System Boiler	41-570-13
i15R Regular Boiler	41-570-04
i18R Regular Boiler	41-570-05
i24R Regular Boiler	41-570-06
i32R Regular Boiler	41-570-07
i40R Regular Boiler	41-570-08

LPG conversion kits for each boiler available



iC & iC Economiser Plus combination boilers technical data

IC COMBINATION BOILERS	i24C	i28C	i36C	i40C
Part number	BC100524	BC100528	BC100536	BC100540
ErP Seasonal space heating energy efficiency class	A	A	A	A
ErP Seasonal space heating energy efficiency (%)	94	94	94	94
ErP Water heating energy efficiency class	A	A	A	A
ErP Water heating energy efficiency (%)	85	84	90	90
ErP Declared load profile DHW	XL	XL	XL	XL
DHW input (kW)	26.6	30.3	39.3	42.0
CH input (kW)	24	24	32	32
Hot water flow rate @ 35°C rise (l/min)	10.1	11.5	14.9	16.2
SEDBUK 2009 (%)	89.7	89.7	89.7	89.7
Dimensions (H x W x D) (mm)	700 x 440 x 355	700 x 440 x 355	700 x 440 x 355	700 x 440 x 355
Boiler lift weight with jig (Kg)	41	41	44	44
Standard warranty (years)	12	12	12	12
LPG conversion kit available	Yes	Yes	Yes	Yes
NOx class / NOx mg / kWh	6 / 30.02	6 / 30.02	6 / 25.71	6 / 27.10
Ingress protection (IP)	IPX4D	IPX4D	IPX4D	IPX4D
Maximum equivalent horizontal flue length (m) 60/100mm	15	15	9	9
Maximum equivalent vertical flue length (m) 60/100mm	15	15	9	9
Maximum equivalent horizontal flue length (m) 80/125mm	50	50	45	45
Maximum equivalent vertical flue length (m) 80/125mm	50	50	45	45

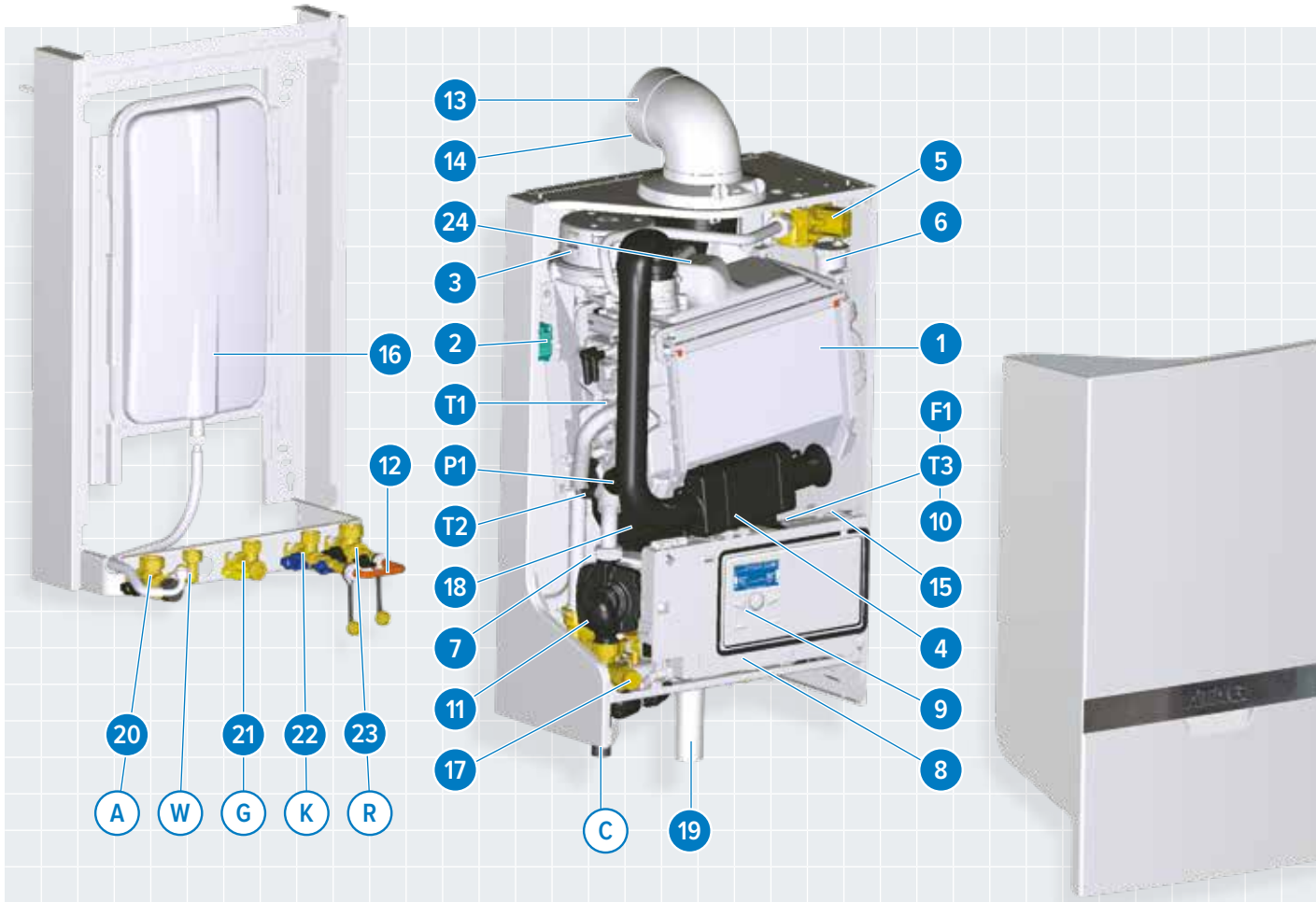
IC ECONOMISER PLUS COMBI BOILERS	iC Economiser 27 Plus	iC Economiser 35 Plus	iC Economiser 39 Plus
Part number	BE200527	BE200535	BE200539
ErP Seasonal space heating energy efficiency class	A	A	A
ErP Seasonal space heating energy efficiency (%)	94	94	94
ErP Water heating energy efficiency class	A	A	A
ErP Water heating energy efficiency (%)	94	96	96
ErP Declared load profile DHW	XXL	XXL	XXL
DHW input (kW)	29.8	40.3	42.5
CH input (kW)	24	32	32
Hot water flow rate @ 35°C rise (l/min)	12.6	16.1	17.0
SEDBUK 2009 (%)	89.7	89.7	89.7
Dimensions (H x W x D) (mm)	700 x 440 x 355	700 x 440 x 355	700 x 440 x 355
Boiler lift weight with jig (Kg)	43	46	46
Standard warranty (years)	12	12	12
LPG conversion kit available	Yes	Yes	Yes
NOx class / NOx mg / kWh	6 / 30.02	6 / 25.71	6 / 25.71
Ingress protection (IP)	IPX4D	IPX4D	IPX4D
Maximum equivalent horizontal flue length (m) 60/100mm	15	8	8
Maximum equivalent vertical flue length (m) 60/100mm	15	8	8
Maximum equivalent horizontal flue length (m) 80/125mm	50	40	40
Maximum equivalent vertical flue length (m) 80/125mm	50	40	40

iS system and iR regular boilers technical data

iS SYSTEM BOILERS	i15S	i18S	i24S	i32S	i40S
Part number	BS300515	BS300518	BS300524	BS300532	BS300540
ErP Seasonal space heating energy efficiency class	A	A	A	A	A
ErP Seasonal space heating energy efficiency (%)	93	93	94	94	94
CH input kW	15	18	24	32	40
SEDBUK 2009 (%)	89.8	89.8	89.8	89.8	89.8
Dimensions (H x W x D) (mm)	700 x 440 x 355	700 x 440 x 355	700 x 440 x 355	700 x 440 x 355	700 x 440 x 355
Boiler lift weight with jig (Kg)	39	39	39	42	42
Standard warranty (years)	12	12	12	12	12
LPG conversion kit available	Yes	Yes	Yes	Yes	Yes
NOx class / NOx mg / kWh	6 / 28.90	6 / 28.74	6 / 30.02	6 / 25.71	6 / 27.10
Ingress protection (IP)	IPX4D	IPX4D	IPX4D	IPX4D	IPX4D
Maximum equivalent horizontal flue length (m) 60/100mm	15	15	15	9	9
Maximum equivalent vertical flue length (m) 60/100mm	15	15	15	9	9
Maximum equivalent horizontal flue length (m) 80/125mm	50	50	50	45	45
Maximum equivalent vertical flue length (m) 80/125mm	50	50	50	45	45

iR REGULAR BOILERS	i15R	i18R	i24R	i32R	i40R
Part number	BR400515	BR400518	BR400524	BR400532	BR400540
ErP Seasonal space heating energy efficiency class	A	A	A	A	A
ErP Seasonal space heating energy efficiency (%)	94	94	94	94	94
CH input kW	15	18	24	32	40
SEDBUK 2009 (%)	89.8	89.8	89.8	89.8	89.8
Dimensions (H x W x D) (mm)	700 x 440 x 355	700 x 440 x 355	700 x 440 x 355	700 x 440 x 355	700 x 440 x 355
Boiler lift weight with jig (Kg)	32	32	32	35	35
Standard warranty (years)	12	12	12	12	12
LPG conversion kit available	Yes	Yes	Yes	Yes	Yes
NOx class / NOx mg / kWh	6 / 28.90	6 / 28.74	6 / 30.02	6 / 25.71	6 / 27.10
Ingress protection (IP)	IPX4D	IPX4D	IPX4D	IPX4D	IPX4D
Maximum equivalent horizontal flue length (m) 60/100mm	15	15	15	9	9
Maximum equivalent vertical flue length (m) 60/100mm	15	15	15	9	9
Maximum equivalent horizontal flue length (m) 80/125mm	50	50	50	45	45
Maximum equivalent vertical flue length (m) 80/125mm	50	50	50	45	45

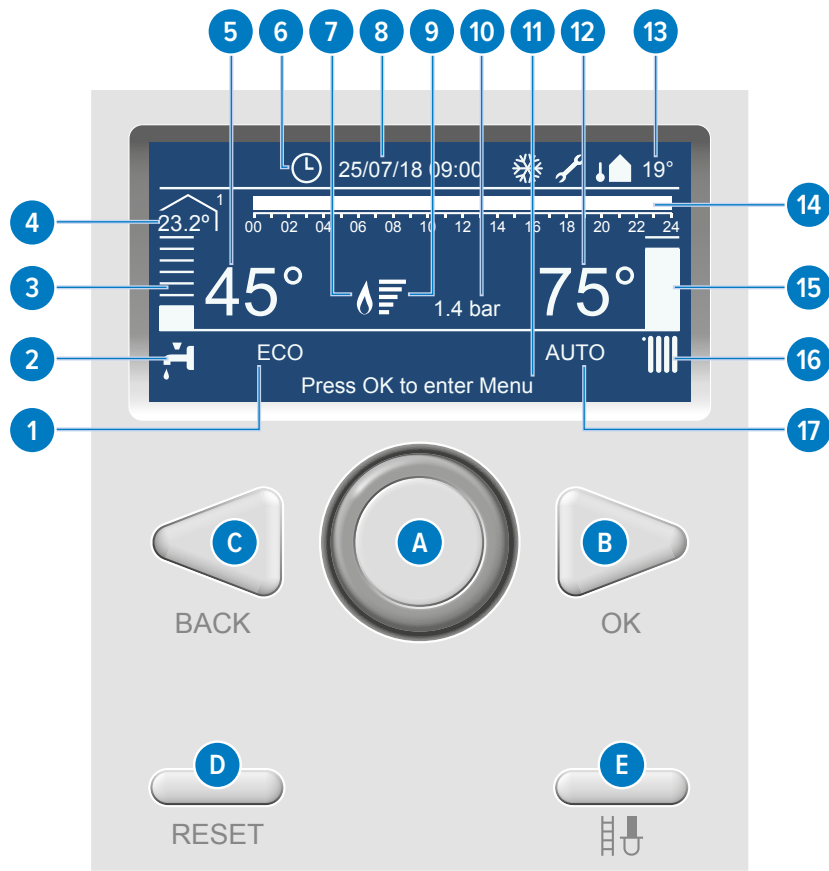
Boiler layout



iC ECONOMISER PLUS COMBINATION BOILER LAYOUT			
1	Heat exchanger	9	Control panel
2	Ignition unit	10	Three-way valve
3	Fan unit	11	Circulation pump
4	Silencer	12	Filling loop
5	Gas valve	13	Flue gas exhaust
6	Automatic air valve	14	Combustion air supply
7	DHW plate heat exchanger	15	Boiler data plate
8	Control unit	16	Expansion vessel
		17	Safety valve
		18	DHW Economiser
		19	Siphon
		20	Isolation valve flow CH
		21	Isolation valve gas
		22	Isolation valve cold water
		23	Isolation valve return CH
		24	Flue non return valve

T1	Flow sensor	P1	Water pressure sensor	C	Condensate pipe
T2	Return sensor	G	Gas pipe	K	Cold water pipe
T3	Hot water sensor	A	Flow pipe CH	W	Hot water pipe
F1	DHW flow sensor	R	Return pipe CH		

Control panel (All ATAG boiler range)



Controller buttons	
A	Selector Wheel Turn the wheel left or right to scroll through available menu options
B	OK button Press to select/confirm an item
C	BACK button Press to go back one screen
D	RESET button Press to reset a fault code
E	Chimney sweep button. Press and hold for 5 seconds to enter into service mode.

Controller display	
1	DHW comfort or economy mode is active
2	DHW status symbol. A box around the tap symbol indicates DHW is in operation
3	Visual illustration of current hot water temperature. Scale changes as the set temperature is changed
4	Internal room temperature (if present)
5	DHW set point temperature
6	CH time program active
7	Flame Burner on
8	Current date and time
9	Actual Power Level
10	Current central heating system water pressure
11	Boiler status indicator, such as "Press OK to enter Menu", error messages and other status information
12	Heating supply set point. This changes with a heating demand to show the heating flow temperature.
13	Outdoor temperature (if connected)
14	Time program
15	Visual illustration of current central heating temperature. Scale changes as the set temperature is changed
16	Central heating status symbol. A box around the radiator symbol indicates central heating is in operation
17	Thermoregulation function enabled

Equivalent flue lengths

The below tables show the maximum permissible flue lengths allowed for the ATAG i Series boiler range:

Flue lengths

Concentric Flue system Ø 60 / 100mm & 80 / 125mm

BOILER	MAXIMUM HORIZONTAL OR VERTICAL EQUIVALENT FLUE LENGTH	
	(Ø 60/100mm)	(Ø 80/125mm)
i24C, i28C, iC Economiser 27 Plus i15S, i18S, i24S i15R, i18R, i24R	15m	50m
i36C, i40C i32S, i40S i32R, i40R	9m	45m
iC Economiser 35 Plus iC Economiser 39 Plus	8m	40m

Dimensions flue gas system and air supply system.
Maximum equivalent flue length = distance between boiler (from elbow or vertical adapter) and the end of terminal.

FLUE BEND	EQUIVALENT FLUE LENGTH	
	(Ø 60/100mm)	(Ø 80/125mm)
45° bend resistance length	1.3m	1.9m
87° bend resistance length	1.9m	3.0m

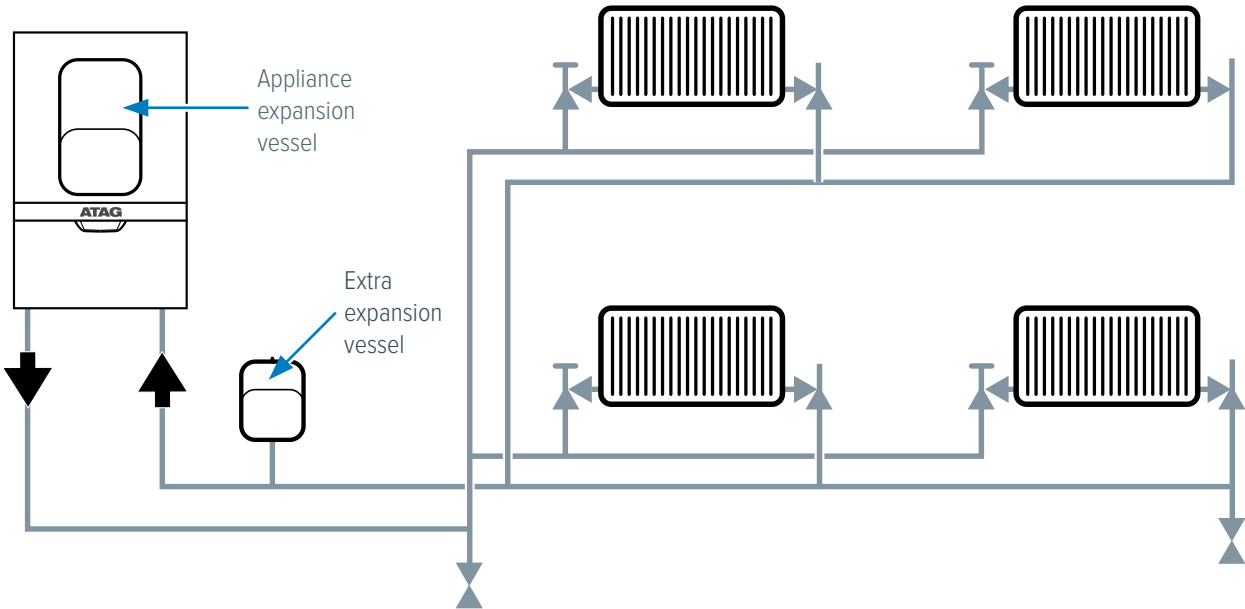
Expansion vessel

The iC & iS boilers are featured with a built-in expansion vessel with a capacity of 8 litres and a pre-pressure charge 1 bar. Where the system volume is more than 100 litres or exceeds 2.65 bar at maximum heating temperature, **then the expansion vessel size is insufficient for the CH system, an additional expansion must be installed.**

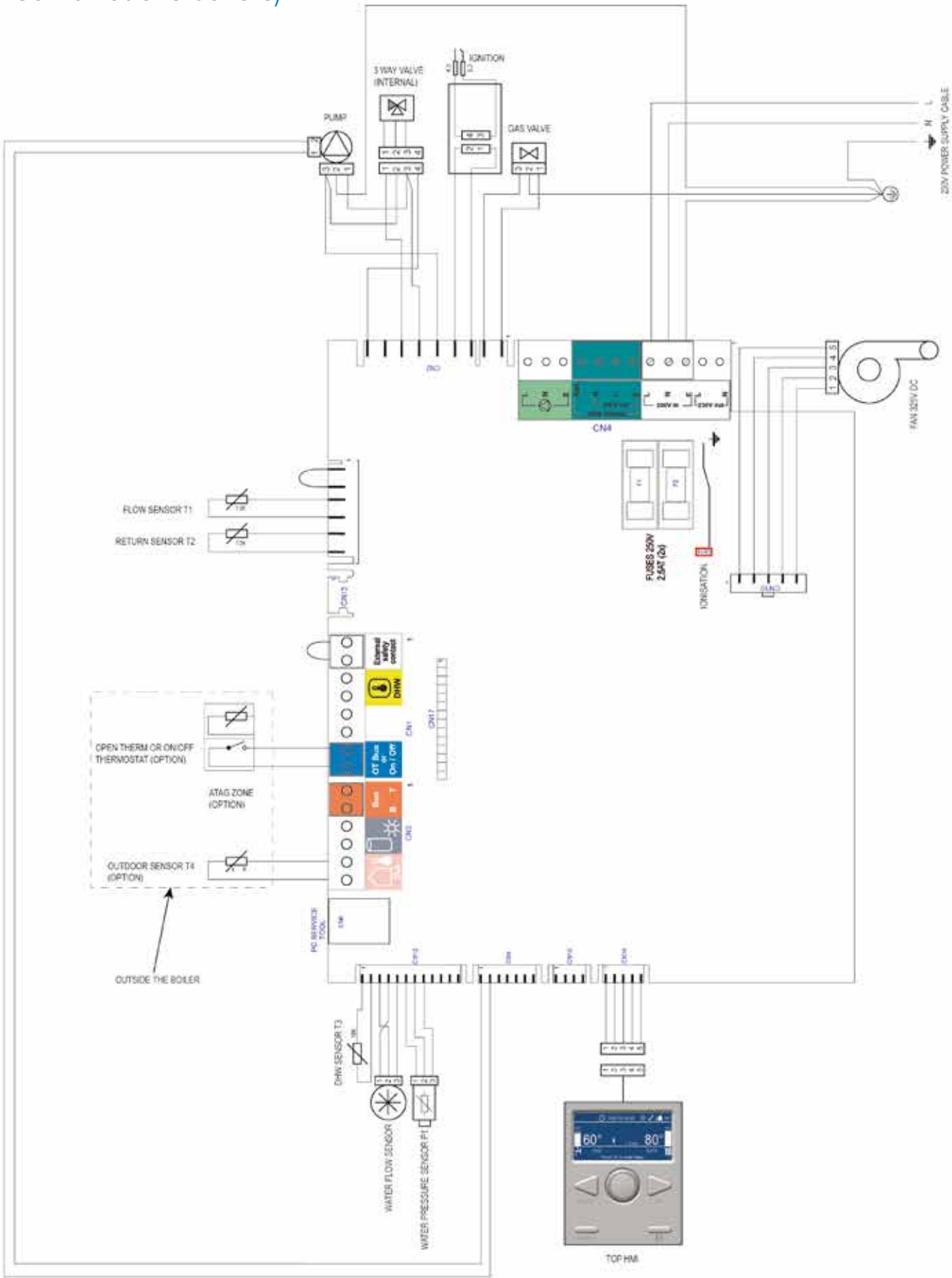
The additional expansion vessel must be installed as close as possible to the appliance in the central heating return. The additional expansion vessel should, together with the built-in expansion vessel, be sized to the water content of the installation.

The pre-pressure charge depends on the height of the installation above the installed expansion vessel as per the table below. Pressurise the extra expansion vessel to the same figure as the expansion vessel built into the appliance.

Installation height above the expansion vessel	pre-charge pressure of the expansion vessel
5m	0.5 bar
10m	1.0 bar
15m	1.5 bar



Electrical diagram (iC Combinations boilers)



External safety contact (white)

This connection comes with a wire link. This link enables the boiler to work. Removing the wire link will stop the boiler from firing up.

The connection can be used to connect a condensate pump safety overflow switch, where this will stop the boiler from firing if the condensate pump cannot get rid of the condensate water and the safety overflow switch is triggered.

DHW sensor connection (yellow)

When an ATAG 3-Port diverter valve kit is fitted it will come with a cylinder sensor and yellow plug. The cylinder sensor wires, and plug connect to the yellow volt free DHW connector position.

OpenTherm BUS & ON / OFF connection (blue)

This PCB will detect if an OpenTherm or an On / Off device is connected to the blue plug on the terminal block.

An OpenTherm compatible device as well as a volt free on / off thermostat or programmable room thermostat can be used to switch on or off the heat demand to the boiler.

ATAG Zone connection (red)

The ATAG ONE^{Zone} smart room thermostat is the primary candidate for use of the ATAG zone eBus connection. The smart room thermostat can also be substituted by another ATAG zone compatible room controller, this eBus enables the boiler to modulate set point temperatures for optimal efficiency. On top of the thermostats, the connection is used for other ATAG zone compatible devices such as zone management accessories. Use a minimum 0.6mm wire with a maximum length of 50m.

Solar inlet sensor connection (grey)

N/A not applicable.

ATAG Outside sensor (rose)

When a weather compensation sensor (supplied with the iC Range of combination boilers only) is used, the two wires from the outside sensor get wired into the plug supplied on the terminal block in the rose connector position.

230V Out (230V live output, white)

Not used.

230V In (230V live input, white)

This is the 230V mains power input to the boiler connection.

230V Control Block (230V live output, aqua blue)

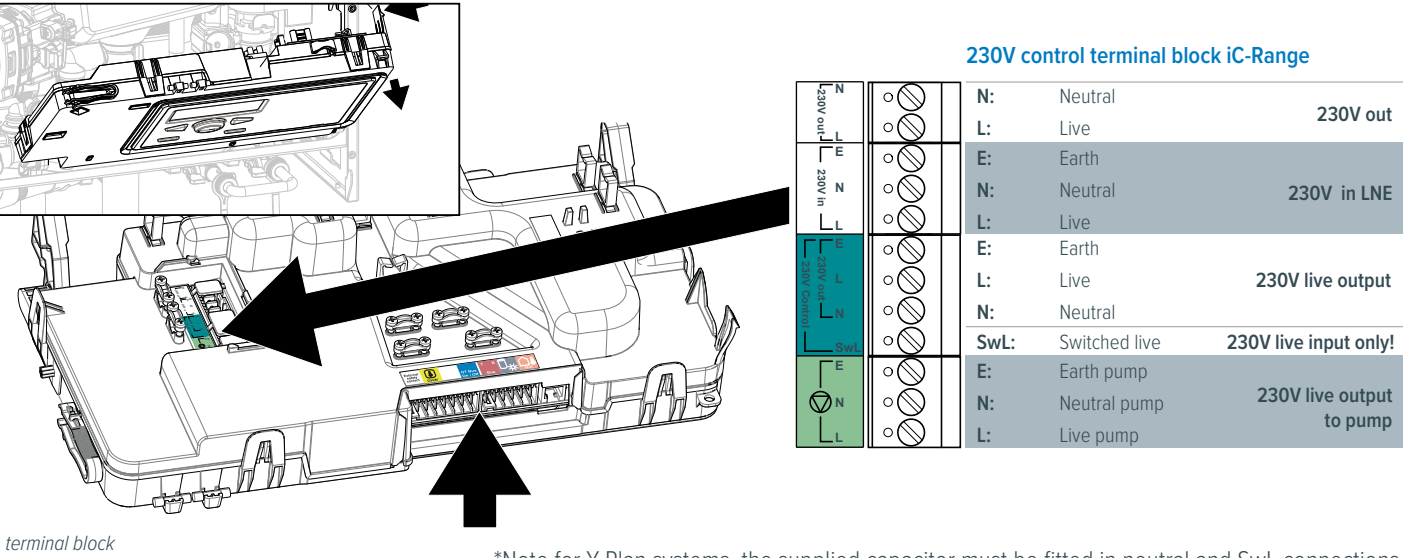
If a live, neutral or earth wire is required for an external clock/programmer these can be taken from the (L) live, (N) Neutral or (E) earth 230V live output aqua blue connections on the 230v control terminal block.

230V Control Block (SwL Switched live, aqua blue)

If a 230V room thermostat is used, then a switched live is required from the control(s) to connect to the 230V control aqua blue connector in position (SwL) Switched live to fire up the boiler. This could be in series after the clock/ programmer to the room stat, then to SwL on the 230V control aqua blue connector.

External pump (230V live output, green) optional extra

If an external pump needs to be controlled and switched on when heating mode is operating on the boiler, 230v power (outlet) can be used to power an external pump on the system. (optional extra plug required part number S4921000).



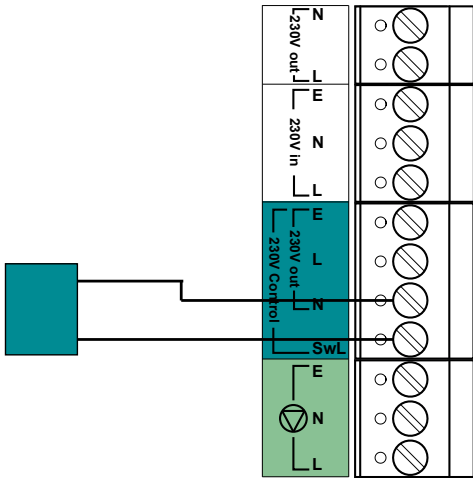
*Note for Y Plan systems, the supplied capacitor must be fitted in neutral and SwL connections.

Fitting the capacitor for Y-plan connection with the iS & iR boilers

Reason for the capacitor:

After a Heating ON period, 50V to 150V will remain on the SWL input of the aqua blue (230V control out and switched live) connector on the boiler from a Y-plan valve, preventing the boiler from turning off. The capacitor will remove this voltage and thus correct functioning of the boiler.

- 1. Isolate the boiler electrically and close the gas valve;
- 2. Pull the aqua blue 230V control out and switched live connector from the terminal;
- 3. Screw the capacitor in the aqua blue connector on the position of the N (neutral) and the SwL (switched live) connection. It does not matter which wire of the capacitor goes into what connection;
- 4. Connect the wires of the Y-plan valve to the connector as well;
- 5. Put the connector with the capacitor and the Y-plan valve connections back on the terminal;
- 6. Put the power back on the boiler and open the gas isolation valve.



ATAG 3-port Hot Water Priority kit

including the ATAG ONE^{ZONE} controller or ATAG Cube used with a vented hot water priority cylinder

Vented hot water priority cylinders

The ATAG 3-port diverter valve is to be fitted external to the boiler on the system pipework with the electrical wiring routed back to the 3 way valve electrical connection on the back of the PCB housing.

The installation will use the cylinder sensor supplied within the 3-port diverter valve kit to control the hot water temperature. Therefore no other cylinder thermostat is required.

The ONE^{ZONE} controller will control the heating and hot water time and temperature requirements. If the ATAG Cube room thermostat is used then the heating and hot water times are controlled on the boilers built in programmer option.

The weather compensation for heating will be controlled by the boiler and ONE^{ZONE} controller via the internet connection and local weather station data. An optional outside sensor (ARZ0055U) can be added

to the 3-port diverter valve kit to sense the outside temperature specifically for the individual property.

With an ATAG Cube fitted the optional outside sensor would be needed if weather compensation was required for the central heating.

When put into heating mode the diverter is powered.

Brown & Blue 230V, Black & Blue 0V.

When put in hot water mode there is a switch of power.

Brown & Blue 230V, Black & Blue 230V.

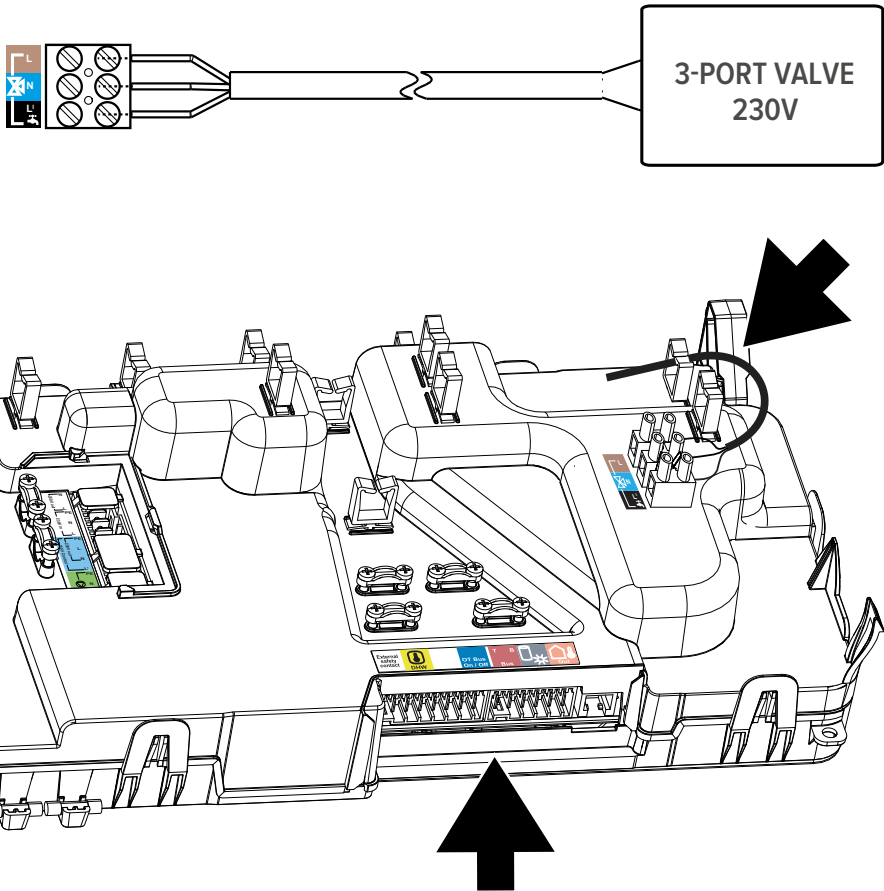
So, hot water power **put on Black & Blue**, heating power **taken off Black & Blue**.

The ATAG 3-port diverter valve

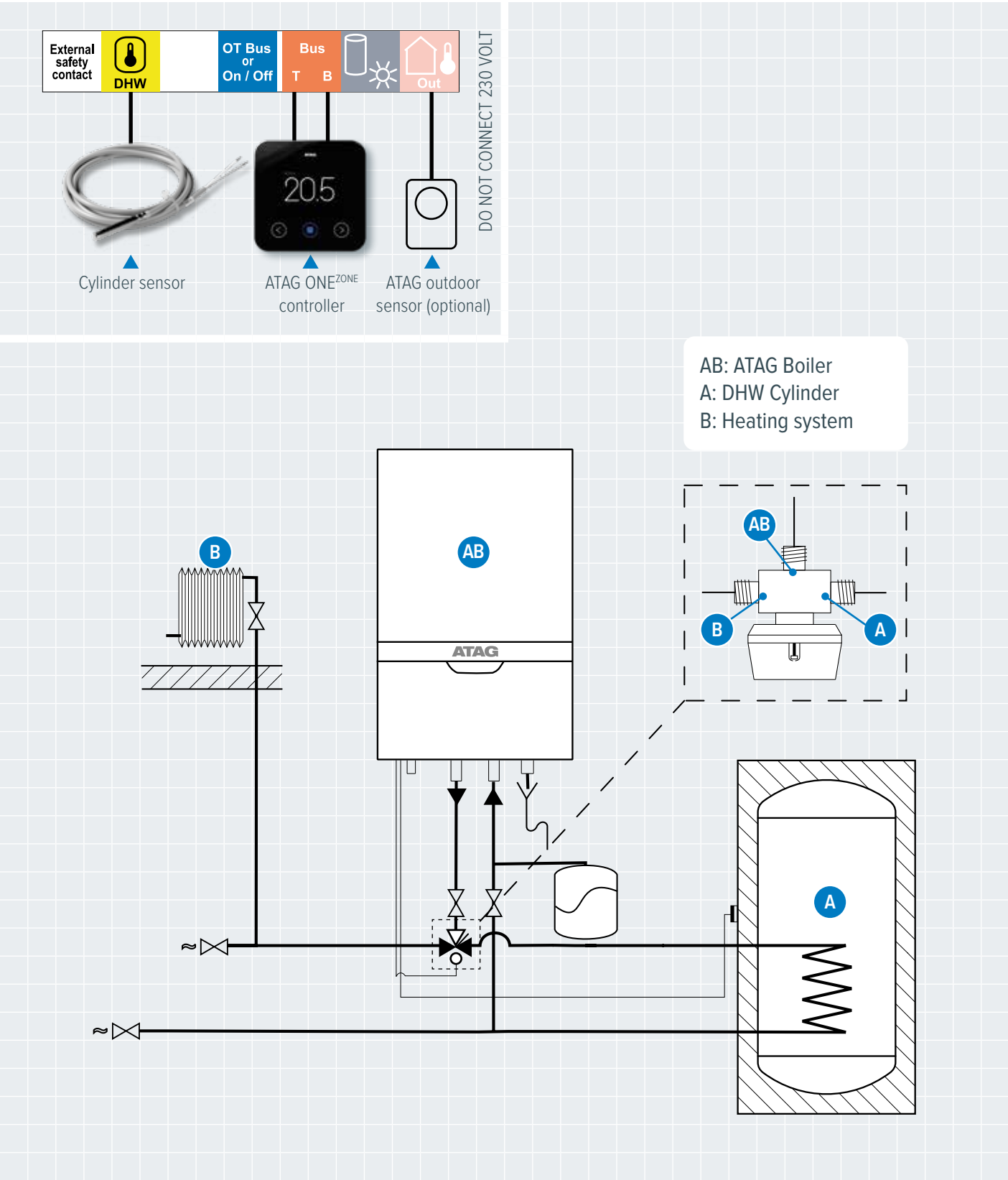
Install the 3-port valve on the system pipework with the valve ports in the following orientation, **AB** port iS System boiler, **A** port hot water cylinder and **B** port heating system (see diagram on page 16).

Connection 3 way valve

- L: Live
- N: Neutral
- L': Signal DHW



Component Diagram



ATAG 3-port Hot Water Priority kit

including the ONE^{ZONE} controller or ATAG Cube used with an unvented hot water cylinder

Unvented hot water cylinders

The installation may have altered wiring of the dual thermostat (depending on the cylinder manufacturer) to only use the high limit thermal cut-out of the dual thermostat.

The high limit thermal cut-out of the dual thermostat MUST be wired to interrupt the power to the 2-port valve supplied with the unvented cylinder.

Fitting of the cylinder temperature sensor

The cylinder sensor is to be fitted into a sensor pocket of the unvented cylinder along with the dual thermostat supplied with the unvented cylinder.

Wiring of components

The 3-port diverter valve will be connected to the spare 3-port valve connector on the wiring loom.

Connect the cylinder sensor with the yellow connector to the yellow DHW volt free position and the ATAG ONE^{ZONE} control or ATAG Cube wires with the red connector to the red BUS volt free position on the top front of the control panel.

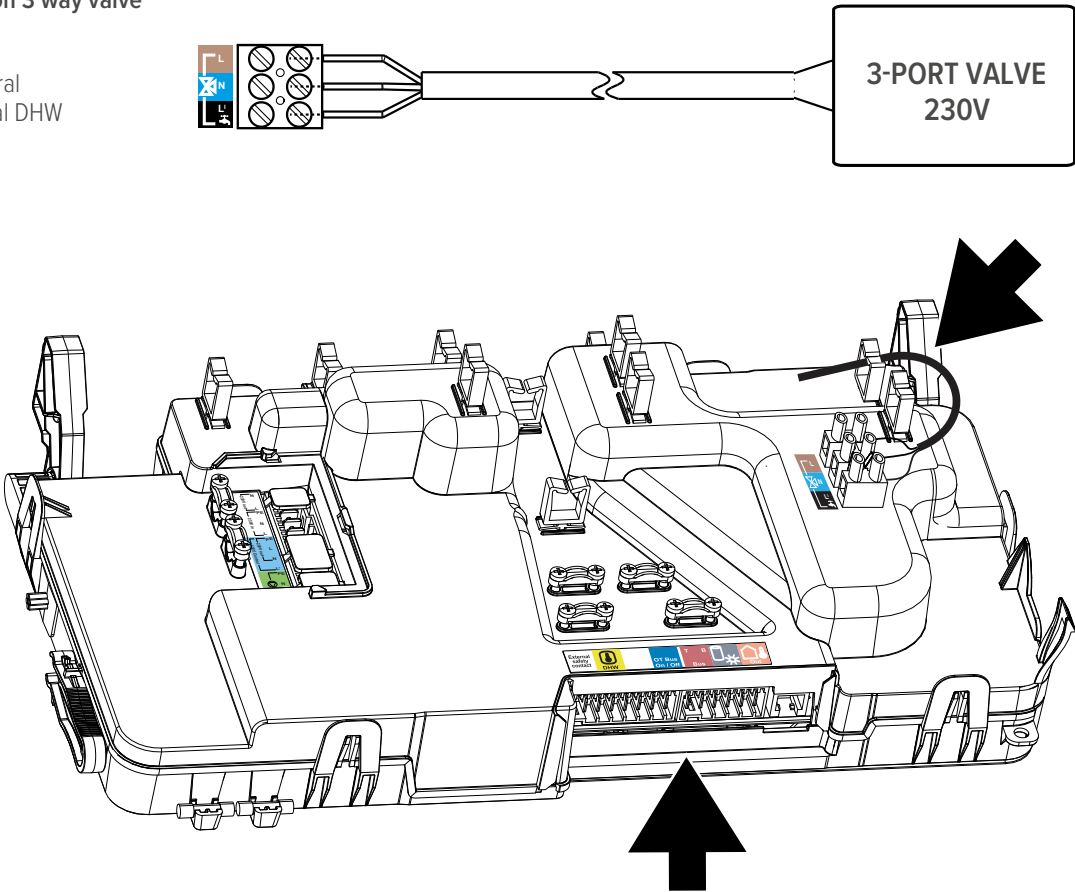
2 port zone valve & dual thermostat (supplied with unvented cylinder)

The 2-port zone valve must be installed in the primary flow pipework between the 3-port valve and the cylinder connection as per the following diagram and G3 unvented hot water requirements.

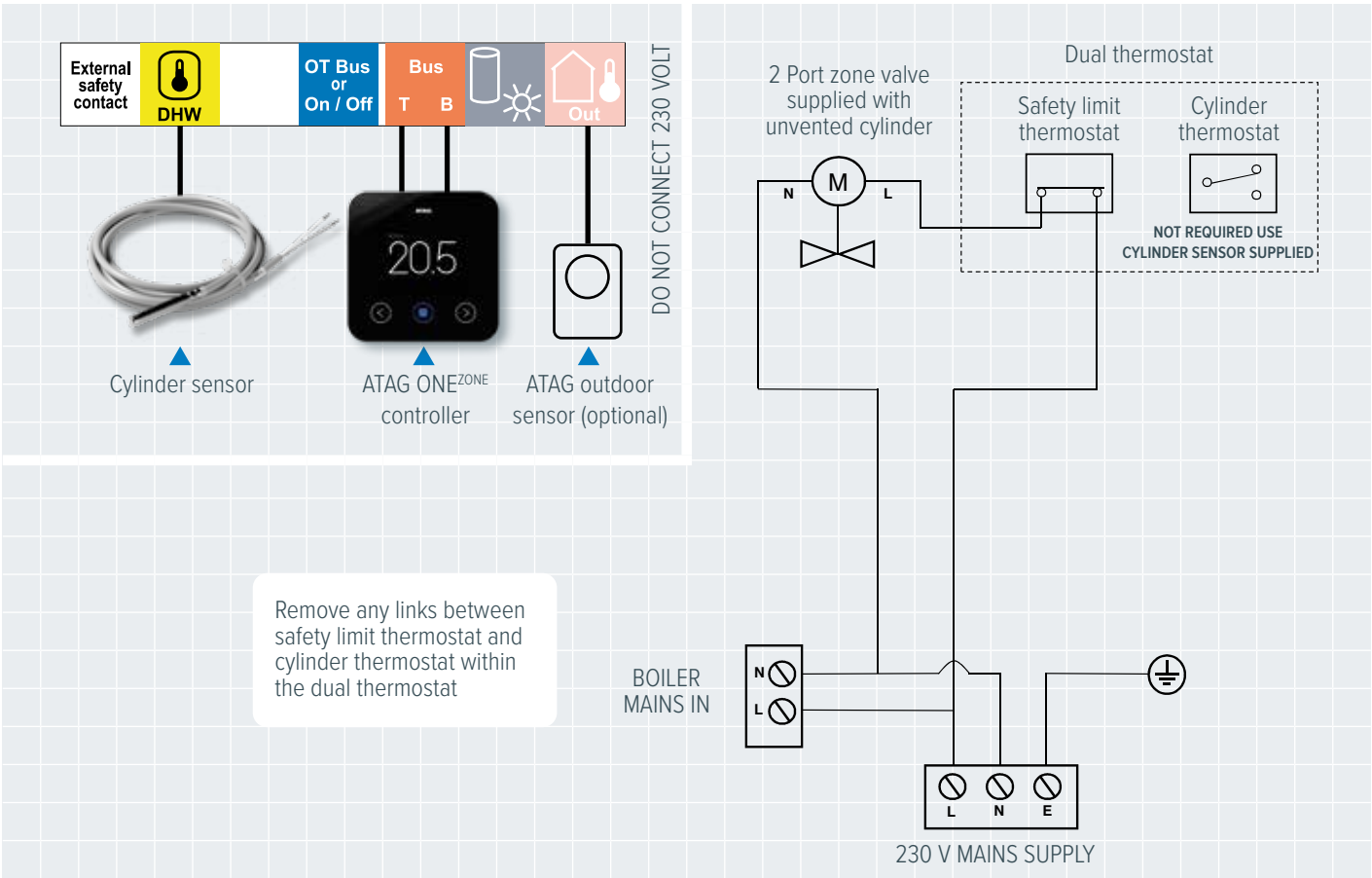
The 230v mains power supply MUST be wired only to the high limit thermal cut-out of the dual thermostat and be wired to interrupt the power to the motor of the 2-port valve as per electrical diagram on page 18.

Connection 3 way valve

- L: Live
- N: Neutral
- L': Signal DHW

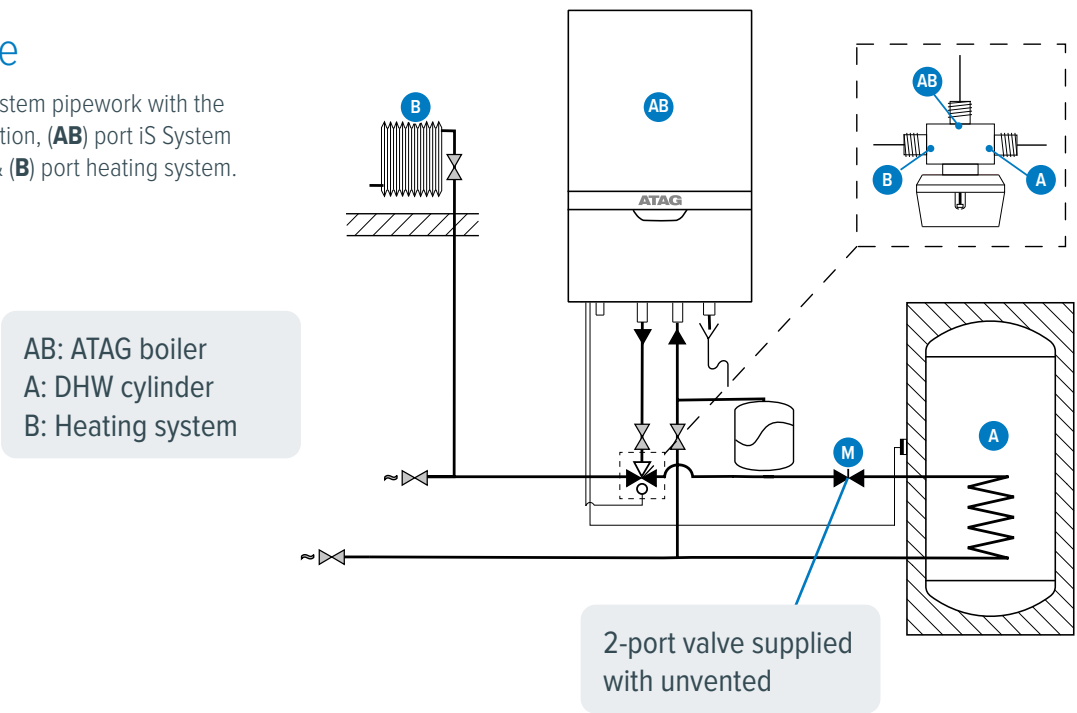


Component Diagram



3-port diverter valve

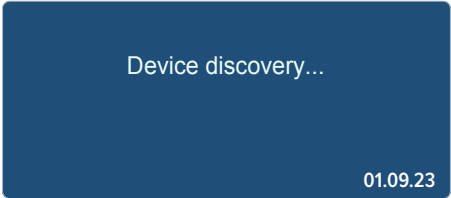
The 3-port diverter valve on the system pipework with the valve ports is the following orientation, (AB) port is System boiler, (A) port hot water cylinder & (B) port heating system.



Commissioning the boiler

Before the boiler is put into operation ensure that the boiler and installation have been fully vented of air. Purge the gas line and open the gas isolation valve to the boiler. The boiler requires no adjustment of the burner pressure and quantity as it has been set in the factory and should not be reset.

- 1 Turn on the boiler electrical supply.



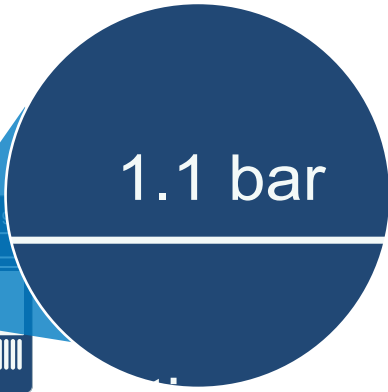
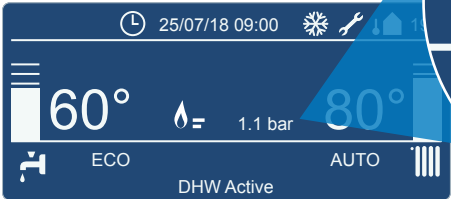
- 2 When the boiler starts up for the first time the following screens will be shown:



- 3 After filling the 7 minute air purge program starts;



- 4 Check the water pressure and top up if necessary to 1.0 – 1.2 bar;

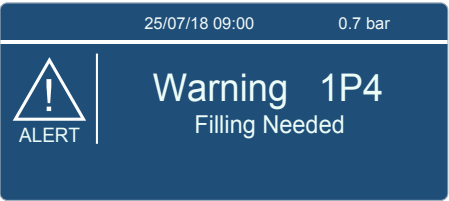


The iC, iC Economiser Plus & iS boilers are supplied with a pressure sensor.

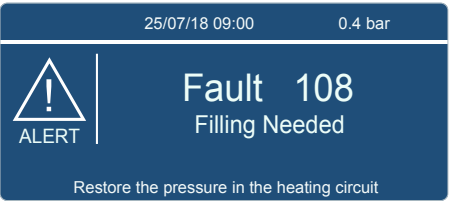
Water pressure sensor

This sensor control has following settings:

- 0.5 bar: below this pressure the burner is blocked for operation
- 0.5 to 0.8 bar: boiler will reduce Tset max by 5°C
- 0.8 to 3.0 bar: boiler fully functional
- 3.0 bar: above this pressure the boiler is blocked for operation



If the water pressure drops below 0.8 bar the text "Warning 1P4 Filling Needed" will appear in the screen; Between 0.5 and 0.8 bar and the boiler will reduce Tset max by 5°C.



If the water pressure drops below 0.5 bar the text "Fault 108 Filling Needed, Restore the pressure in the heating circuit " will appear in the screen; The air purge program starts when the water pressure has been below 0.5 bar. The automatic air purge program will take approx. 7 minutes and will be followed by the home screen when the water pressure is taken above 1.2 bar.

Flow switch (Regular boiler)

The regular boiler utilises a flow switch to allow the boiler to detect a flow of water through the heat exchanger. The minimum flow required to activate the flow switch is 7l/m +/- 10%.

If the minimum flow cannot be achieved, the boiler will not fire and will show a 141-fault code. This is normally caused by air in the system or poor system circulation.

Pump kick and diverter valve kick

Every 24 hours, if there is no heat demand from heating or DHW the pump will be started for 10 seconds and the diverter valve will be opened and closed again. This is done to prevent the pump and diverter valve from sticking.

Boiler anti-cycle time

If during a demand for central heating the burner switches off, because the desired flow temperature is exceeded, there will be an anti-cycle time in operation for 5 minutes. This means that the burner switches on again after 5 minutes if there is still a demand for the heating. The boiler display will show ‘Pump Active’ during an anti-cycle period.

Pump overrun

After the heating demand the burner will shut down and the pump will run for a further 60 seconds. This can be changed in parameter 2.3.7 from 1 - 16 minutes. After DHW demand it would be 30 seconds if T1 is <75°C or 3 minutes if T1 >75°C.

Air Purge Program (Combi and System boilers)

The boiler is equipped with an automatic air purge program. The installation system needs to be filled with water and bled free of air before turning power onto the boiler. Then the automatic air purge program will ensure that the boiler is free of air before firing up.

The automatic air purge program starts when the water pressure in the boiler gets to 1.1 bar. The display will show ‘Air purge Active’ on the screen with the current central heating system water pressure. The complete program for the boiler air purge takes 7 minutes.

During these 7 minutes, the pump is started and stopped, and the three-way diverter valve is alternately sent to the heating and to the DHW position several times and with short pauses to make sure that the air inside the boiler leaves through the automatic air vent.

System boiler

Same as combi, but there is no internal diverter valve to move.

Regular boiler

Same as combi, but there is no diverter valve to move or a pressure reading as there is a feed & expansion tank.

Note: The Air Purge Program also activates anytime the electricity supply is interrupted to the boiler. If there is no need to clear air from the boiler, this function can be bypassed to save time. To do this, simply press any button to wake up the display and then press, and hold, the back button until the home screen is displayed on the boiler.

If there is a possibility of air in the boiler, due to a change of component or otherwise, **DO NOT BYPASS** the Air Purge Program.

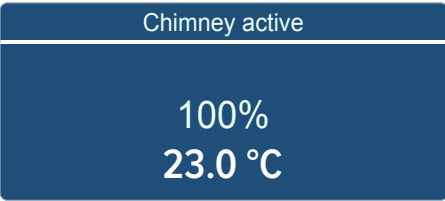
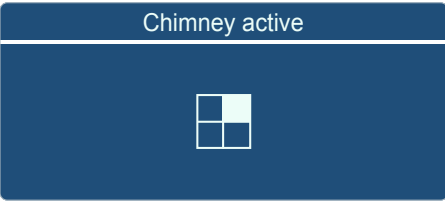
Checking combustion CO₂/O₂

The CO₂ /O₂ percentage is set in the factory. This has to be checked during commissioning, inspection, maintenance and in case of a failure.

This can be verified by means of the following action:

- Ensure that the boiler is in operation and that the heat, which it produces, can be discharged
- If taps are opened the internal diverter motor will move and heat can be discharged through the hot water side of the boiler. (multiple taps open is preferred)
- Calibrate the flue gas analyser
- Place the lance of the flue gas analyser into the flue gas test point

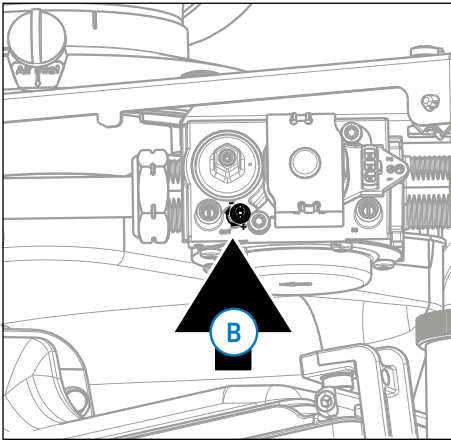
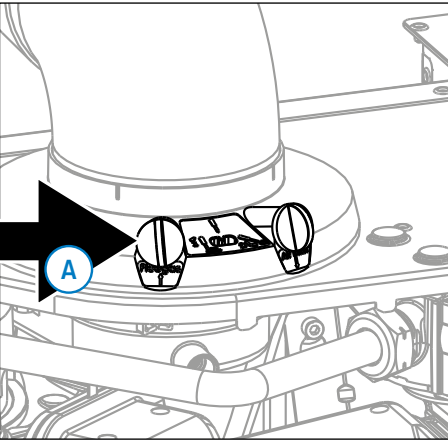
Step 1: Set the full load



You can set the full load of the boiler as follows:

To Start: Press any button to wake up the screen

- Press the **chimney sweep** button for 5 seconds;
- Turn the selector wheel until you reach 100%;
- Press **OK**; The boiler will switch to maximum power output (full load) of the boiler; the screen shows 100% (heating capacity)
- Calibrate the Flue Gas Analyser, and then insert the flue gas probe of the Flue Gas Analyser into the measuring point of the flue gas pipe “**A**” (see illustration)
- Wait for one minute and then carry out a combustion analysis
- Check whether the CO₂ values that are listed below correspond to the measured value



If required, you may turn the setting screw “**B**” (see above illustration) to set the correct CO₂ percentage.

A - Measuring point for the flue gas probe **B** - Set screw for CO₂

CO₂ /O₂ High Load reading

After this check has been done at full load, the CO₂ value at low load need to be tested. If there are any deviations in the result, then these must be corrected (see Step 3).

FULL LOAD	NATURAL GAS (G20)	HYDROGEN MIXED IN NATURAL GAS	PROPANE GAS (LPG) (G31)*
CO ₂	Nominal 9.0%	--	Nominal 10.3%
	Minimum 8.6% – Maximum 9.6%	--	Minimum 9.9% – Maximum 11%
O ₂	Nominal 4.7%	Nominal 4.7%	Nominal 5.1%
	Minimum 3.6% – Maximum 5.5%	Minimum 3.6% – Maximum 5.5%	Minimum 4.1% – Maximum 5.8%

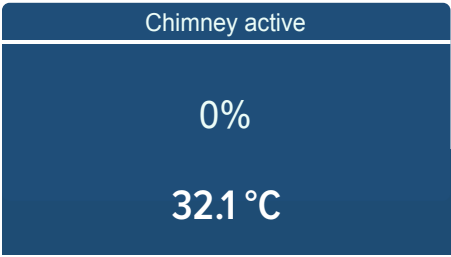
* Only possible if LPG conversion kit is installed! Note: Values are valid with closed cover/air box.

Step 2: CO₂ /O₂ check on low load

The low load of the boiler can be set by you as follows:



- Turn the selector wheel until you reach 0%;
- Press **OK**; The boiler will switch to minimum power output (low load) of the boiler; the screen shows 0% (heating capacity)



The CO₂ value at low load must be lower than the CO₂ value at full load. The measuring procedure must be carried out, until a constant value is achieved.

Low load	Natural gas (G20) and Hydrogen mixed in natural gas		Propane (G31)*	
	Full load recorded	Accepted low range	Full load recorded	Accepted low range
CO ₂ / O ₂ Example readings	9.6% (3.6% O ₂)	9.3% - 75% (4.2% - 7.7% O ₂)	11.0% (4.0% O ₂)	10.9% - 8.9% (4.1% - 7.3% O ₂)
	9.5% (3.8% O ₂)	9.2% - 7.5% (4.3% - 7.5% O ₂)	10.9% (4.2% O ₂)	10.8% - 8.9% (4.3% - 7.3% O ₂)
	9.4% (4.0% O ₂)	9.1% - 7.5% (4.5% - 7.5% O ₂)	10.8% (4.3% O ₂)	10.7% - 8.9% (4.4% - 7.3% O ₂)
	9.3% (4.2% O ₂)	9.0% - 7.5% (4.7% - 7.5% O ₂)	10.7% (4.5% O ₂)	10.6% - 8.9% (4.6% - 7.3% O ₂)
	9.2% (4.3% O ₂)	8.9% - 7.5% (4.9% - 7.5% O ₂)	10.6% (4.6% O ₂)	10.5% - 8.9% (4.7% - 7.3% O ₂)
	9.1% (4.5% O ₂)	8.8% - 7.5% (5.1% - 7.5% O ₂)	10.5% (4.8% O ₂)	10.4% - 8.9% (4.9% - 7.3% O ₂)
	9.0% (4.7% O ₂)	8.7% - 7.5% (5.2% 7.5% O ₂)	10.4% (4.9% O ₂)	10.3% - 8.9% (5.0% - 7.3% O ₂)
	8.9% (4.9% O ₂)	8.6% - 7.5% (5.4% - 7.5% O ₂)	10.3% (5.1% O ₂)	10.2% - 8.9% (5.2% - 7.3% O ₂)
	8.8% (5.1% O ₂)	8.5% - 7.5% (5.6% - 7.5% O ₂)	10.2% (5.3% O ₂)	10.1% - 8.9% (5.4% - 7.3% O ₂)
	8.7% (5.2% O ₂)	8.4% - 7.5% (5.8% - 7.5% O ₂)	10.1% (5.4% O ₂)	10.0% - 8.9% (5.5% - 7.3% O ₂)
	8.6% (5.4% O ₂)	8.3% - 7.5% (6.0% - 7.5% O ₂)	10.0% (5.6% O ₂)	9.9% - 8.9% (5.7% - 7.3% O ₂)
	-	-	9.9% (5.7% O ₂)	9.8% - 8.9% (5.8% - 7.3% O ₂)

* Only possible if LPG conversion kit is installed! Note: Values are valid with closed cover/air box.

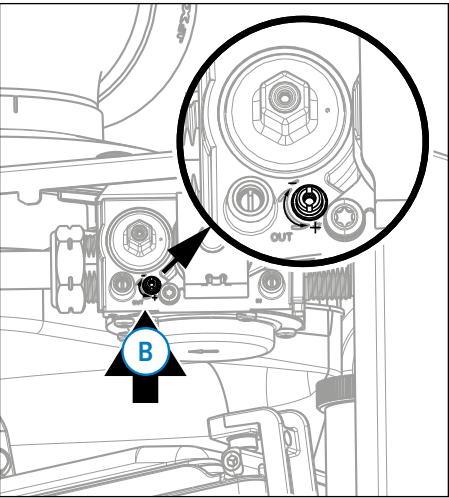
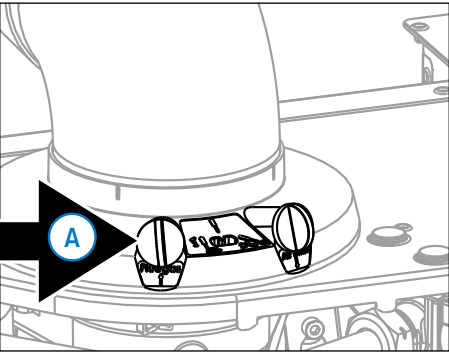
NOTE: UNDER ALL CIRCUMSTANCES THE CO₂ AT LOW LOAD MUST BE LOWER THAN THE CO₂ AT FULL LOAD.

End of measuring:

- Press the back button for 5 seconds to exit chimney sweep mode
- This completes the procedure
- The maximum duration of the commissioning function, without interruption, is 20 minutes

Step 3: Adjustment on the gas valve

Adjust the gas valve only in case the measured values lie out of the range of the values mentioned in step 1 or 2.



- Take the case off the boiler;
- Set the boiler on full load (see Step 1)
- The CO₂ /O₂ values are set by using an Allen key (2 mm), or a large flat head screwdriver, on the screw “B”

Please observe the following rotating direction:

- Clockwise means less CO₂ /O₂
- Counter clockwise means more CO₂ /O₂

AFTER THIS SETTING HAS BEEN MADE, ONCE MORE TEST THE CO₂ /O₂ VALUE AT FULL LOAD AND LOW LOAD WITH THE CASE ON. SEE STEP 1 AND 2.

Boiler information

To gain access to the boiler information, proceed as follows:

- 1 From the controller Home screen. Press **OK**.
- 3 Turn the selector wheel to highlight **Information menu**. Press **OK**.
- 4 As an example, turn the selector wheel to highlight Pump flow rate. Press **OK**.



CH Settings
DHW Settings
Information menu
Screen Settings

A list with different forms of information will now appear. (See screens below)

CH flow temperature
CH return temperature
DHW Flow T
CH flow set T
Exhausts Flue T

Outdoor T	10
Heating circuit pressure	2.0
DHW flow rate	0
Ionization current	0
Fan speed	0

Fan status	1
Diverter Valve Pos	1
Pump modulation %	25
Pump flow rate	891
Gas power	14

Diverter Valve Pos	1
Pump modulation %	25
Pump flow rate	891
Gas power	14
TStrage measured T	--

The screen below appears.

Pump flow rate
891 l/h

A list of the most common boiler information can be found in the table below.

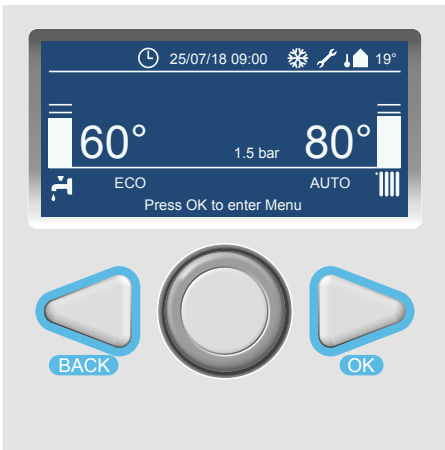
Fan Speed in Rpm
DHW Flow Rate in l/min
Gas Power in kW
Heating circuit pressure in bar
CH Flow Set T in °C
CH Flow T in °C
CH Return T in °C
DHW Flow T in °C
Outdoor T (only if an outside sensor is connected) in °C
Ionisation current in µA
Pump flow rate in l/h

Technical menu and Parameters

The boiler has a technical menu for engineers to use for altering settings / parameters and gaining information such as flow and return temperatures. When the boiler is installed, it is in principle ready to be put into service. Most settings of the control system are already programmed from factory.

To gain access to the technical menu follow these steps:

To start: Press any button to wake up the screen



- 1

From the controller Home screen, press the **BACK** and **OK** buttons at the same time for 7 seconds.
- 2

Turn the selector wheel to highlight **007** as the Technical Code. Press **OK** to Save.

Insert Code

Insert technical code

007

Save

- 3

The screen below then appears with the options:
Language, date and time
Complete Menu
Configuration Wizard
Service
Faults

Technical area

Language, date and time

Complete Menu

Configuration Wizard

Service

Faults

- 4

The screen below appears. This way you have access to the complete parameter level.

Menu

0 Network

1 <Not Available>

2 Boiler Parameters

3 <Not Available>

4 Zone 1 Parameters

Parameter listing

Parameter number	Name	Description	Range	Factory Setting
0. NETWORK				
0.2 Bus Network				
0.2.0	Network Presence	Indication of devices connected via BUS Boiler Remote Modem OpenTherm Gateway		1
0.4 User Interface				
0.4.0	Zone to be set by display		1 - 3	1
0.4.1	Backlight Timing		1 min - 24 hrs	10 min
0.4.3	Time Program Service Type	Turn selector wheel: 0 = Time programs 1 = Extended time programs		0
0.4.4	Reset System Interface	OK = Yes, BACK = No		
2. BOILER PARAMETERS				
2.0 General				
2.0.0	DHW Set point	Water set point temperature in DHW mode during comfort periods	40 - 65 (°C)	60
2.0.2	Gas Type	0 = Nat Gas 1 = LPG 2 = G230 N.A.	0 - 2	0
2.0.4	Altitude	Parameter for altitude compensation	0 - 7000 (m)	0
2.0.6	T-Gradient	Gradient Function	0 - 15 (°C/min)	5
2.1 Free parameters				
2.1.1	Boiler Free Parameter		0 - 255	
2.1.7	Pump Continuous Running	0 = Disabled 1 = Enabled	0 - 1	0
2.2 Settings				
2.2.4	AUTO Function	0 = Absent 1 = Present	0 - 1	1
2.2.7	Boiler Hybrid	Used to set the boiler as a part of a hybrid system (Energy manager presence detected) 0 = Disabled 1 = Enabled	0 - 1	0
2.2.8	Boiler Version	Type of boiler selection 0 = Combi 1 = Storage with NTC (Used with ATAG Hot water priority kit) 2 = Storage with Thermostat (Used with standard cylinder stat)	0 - 2	0
2.3 Central Heating - 1				
2.3.1	Max CH Adjustable	CH power level adjustable by engineer to the level required (Range Rating)	0 – 100 (%)	100
2.3.7	CH Pump Overrun	CH post circulation time	0 - 15 (min)	1
2.3.9	Delta T Pump Setting		5 - 20 (°C)	20
2.4 Central Heating - 2				
2.4.5	Max PWM Pump	Maximum pump speed in CH mode	75 - 100 (%)	i24C: 75% i28C: 75% i27EC+: 75% i36C: 85% i40C: 85% i35EC+: 85% i39EC+: 85%
2.4.6	Min PWM Pump	Minimum pump speed in CH mode	25 – 100 (%)	39
2.4.9	External Temp Correction	Offset of the Outdoor temperature reading	-3 to +3 (°C)	0

Parameter number	Name	Description	Range	Factory Setting
2.5 Domestic Hot Water				
2.5.0	Comfort Function	DHW pre-heating or storage heating operation mode selection 0 = Disabled (When disabled the display will show ECO) 1 = Time Based 2 = Always active	0 - 2	2
2.5.5	Heating start delay after DHW preparation		0 - 30 (min)	2
2.6 Boiler Manual Settings				
2.6.0	Manual Mode Activation	To enable or disable manual mode 0 = OFF 1 = ON	0 - 1	0
2.6.1	Boiler Pump Control	0 = OFF 1 = ON	0 - 1	0
2.6.2	Fan Control	0 = OFF 1 = ON	0 - 1	0
2.6.3	Diverter Valve Control	0 = DHW 1 = CH	0 - 1	0
2.6.5	Additional Output Control	0 = OFF 1 = ON	0 - 1	0
2.6.7	External Pump Control	0 = OFF 1 = ON	0 - 1	0
2.7 Test & Utilities				
2.7.0	Test Mode	Chimney sweep function active 0 = OFF 1 = ON	0 - 1	0
2.7.1	Air Purge Function	Air purge function activation 0 - OFF 1 = ON	0 - 1	0
2.8 Reset Menu				
2.8.0	Reset Factory Settings	OK = Yes BACK = No		
2.9 Other				
2.9.0	GPI Function on external safety input Do NOT adjust!	Selected function for GPI input signal: 0 = Burner block NO 1 = Burner block NC 2 = DHW Timer	0 - 2	1
2.9.1	Building Frost Protection	0 = OFF 1 = ON	0 - 1	0
2.9.2	Pump Communication	0 = OFF 1 = ON	0 = Pump without flow feedback 1 = Pump with flow feedback	1
2.9.3	Flue Gas Sensor Type	N.A.		
2.9.4	Weather Dependent Pump Control	0 = OFF 1 = ON	0 - 1	0
2.9.5	OpenTherm Gateway Activation	0 = OFF 1 = ON	0 - 1	1
4. ZONE 1 PARAMETERS				
4.0 Set Point				
4.0.0	T Day	Room temperature set point for day period	10 - 30 (°C)	20
4.0.1	T Night	Room temperature set point for night period	10 - 30 (°C)	15
4.0.2	T set Zone 1	Temperature set point for zone 1 (Limited by Para 4.2.5 & 4.2.6)	30 (°C) - 85 (°C) 20 (°C) - 50 (°C)	85 50
4.0.3	Zone Frost Protection		2 - 15 (°C)	5
4.1 Summer/Winter Changeover				
4.1.0	S/W Function Activation	0 - OFF 1 - ON (only active when outside temperature influence)	0 - 1	0
4.1.1	S/W Temperature Threshold	The set temperature the CH will turn off at, when using weather compensation	0 - 30 (°C)	15
4.1.2	S/W Delay Time	Time before S/W changeover becomes active	0 - 300 (min)	30
4.2 Zone 1 settings				
4.2.0	Zone Temperature Range	0 = low temp (LT) 1 = high temp (HT)	0 = from 20 - 50 (°C) 1 = from 30 - 85 (°C)	1
4.2.1	Thermoregulation	0 = Fixed Flow T or OpenTherm 1 = Basic Thermoreg 2 = Room T Only (Used with e-bus connector for One Zone or Cube) 3 = Outdoor T and low voltage controls only (On/Off Thermostat works) 4 = Room + Outdoor T used with e-bus connector and One Zone Controller. (e-bus thermostat needed)	0 - 4	0
4.2.2	Slope Heating Line		LT: from 0.2 - 1.0 HT: from 1.0 - 3.5	0.6 1.3

Parameter number	Name	Description	Range	Factory Setting
4.2.3	Offset Heating Line	Off set heating line adjustable per °C	LT: from -7 to +7 (°C) HT: from -14 to +14 (°C)	0 0
4.2.5	Maximum Temperature	Zone 1 Maximum Flow Temperature	LT: from 20 - 50 (°C) HT: from 30 - 85 (°C)	50 (°C) 80 (°C)
4.2.6	Minimum Temperature	Zone 1 Minimum Flow Temperature	LT: from 20 - 50 (°C) HT: from 30 - 85 (°C)	20 (°C) 30 (°C)
4.2.8	Quick Night Set Back	0 = OFF 1 = ON	0 - 1	0
4.2.9	Heat Request Mode	0 = Standard 1 = RT Time Programs Exclusion 2 = Forcing Heat Demand	0 - 2	0
4.3 Zone 1 Diagnostics				
4.3.0	Room Temperature Zone 1 (°C)	(only visualisation)		
4.3.1	Room Temperature Set Point Zone 1 (°C)	(only visualisation)		
4.3.4	Heat Request Zone 1	Heat demand present = 1 if not present = 0	0-1	
4.3.7	Relative Air Humidity	(Hybrid systems only)		
4.4 Zone 1 Module Settings (Only visible if using a Zone Manger or Pump Module)				
4.4.0	Zone Pump Modulation	0 = Fixed 1 = Modulating on DeltaT 2 = Modulating on pressure		1
4.4.1	Target DeltaT for Pump Modulation		4 - 25 (°C)	7°C (Low temperature) 20°C (High temperature)
4.4.2	Pump Fixed Speed		20 - 100%	100%
4.7 Zone 1 Regulation Parameters				
4.7.0	Heating Type	0 = Floor Heating 1 = Radiators 2 = Floor heating (main) + Radiators 3 = Radiators (main) + Floor heating 4 = Convection 5 = Air heating		1
4.7.1	Room Influence	0 = OFF 1 = Less 2 = Medium 3 = Good		0
4.7.2	Building Insulation Level	0 = Poor 1 = Average 2 = Good		0
4.7.3	Building Size	0 = Small 1 = Average 2 = Large		0
4.7.4	Climate Zone	Maximum Value = 50 (°C) Minimum Value = -60 (°C)		-10 (°C)
4.7.5	Auto Slope Adaptation	0 = OFF 1 = ON		0
4.7.6	Pre-heat Function	0 - OFF 1 - ON		0
4.8 Advanced				
4.8.3	Heating Control	2 = Room sensor		2
5. SETTINGS ZONE 2 (SEE ZONE 1 CHAPTER 4)				
6. SETTINGS ZONE 3 (SEE ZONE 1 CHAPTER 4)				

Parameter number	Name	Description	Range	Factory Setting
7. ZONE MODULE (only visible if using a zone manger or pump module).				
7.1 Manual Mode				
7.1.0	ZM Manual Mode Activation	0 = OFF 1 = ON		0
7.1.1	Z1 Pump Control	0 = OFF 1 = ON		0
7.1.2	Z2 Pump Control	0 = OFF 1 = ON		0
7.1.3	Z3 Pump Control	0 = OFF 1 = ON		0
7.1.4	Z2 Mix Valve Control	0 = OFF 1 = OPEN 2 = CLOSED		0
7.1.5	Z3 Mix Valve Control	0 = OFF 1 = OPEN 2 = CLOSED		0
7.1.6	Z1 Mix Valve Control	0 = OFF 1 = OPEN 2 = CLOSED		0
7.2 General Zone Module				
7.2.0	Hydraulic Scheme Definition	0 = Not Defined 1 = N.A. 2 = MGM II (1 direct circuit and 1 mixed circuit) 3 = MGM III (1 direct circuit and 2 mixed circuit) 4 = N.A. 5 = MGZ II (2 direct circuits) 6 = MGZ III (3 direct circuits)		
7.2.1	Flow T Offset	N.A		
7.2.2	Auxiliary Output Setting	0 = Heat Request 1 = External Pump 2 = Alarm		0
7.2.3	External Temperature Correction		-3 - 3 (°C)	0
7.2.4	Valves Overrun Time	N.A		
7.2.5	Valves Driving Delta T	N.A		
7.2.6	Valves Kp Heating	N.A		
7.2.7	Mixing Zones Shifting Mode	N.A		
7.2.8	Pumps Overrun Time		150 - 600 sec	150 sec
7.2.9	HC Pump Overrun DHW	N.A		
7.4 Manual Mode - 2				
7.4.0	Manual Mode Activation	0 = OFF 1 = ON		0
7.4.1	Z4 Pump Control	0 = OFF 1 = ON		0
7.4.2	Z5 Pump Control	0 = OFF 1 = ON		0
7.4.3	Z6 Pump Control	0 = OFF 1 = ON		0
7.4.4	Z5 Mix Valve Control	0 = Off 1 = Open 2 = Close		0
7.4.5	Z6 Mix Valve Control	0 = Off 1 = Open 2 = Close		0
7.5 General Zone Module 2				
7.5.0	Hydraulic Scheme Definition	0 = Not Defined 1 = N.A. 2 = MGM II (1 direct circuit and 1 mixed circuit) 3 = MGM III (1 direct circuit and 2 mixed circuit) 4 = N.A. 5 = MGZ II (2 direct circuits) 6 = MGZ III (3 direct circuits)		
7.5.1	FlowT Offset		0 - 40 (°C)	1 (°C)

Parameter number	Name	Description	Range	Factory Setting
7.5.2	Auxiliary Output Setting	0 = Heat request 1 = External pump 2 = Alarm		0
7.5.3	External Temperature Correction		-3 - 3 (°C)	0 (°C)
7.5.4	Valves Overrun Time	N.A		
7.5.5	Valves Driving Delta T	N.A		
7.5.6	Valves Kp Heating	N.A		
7.5.7	Mixing Zones Shifting Mode	N.A		
7.5.8	FlowT Offset Cooling		0 - 6 (°C)	1 (°C)
7.5.9	Pumps Overrun Time		150 - 600 sec	150 sec
7.6 Other 2				
7.6.0	Free Parameter	N.A		
7.6.1	Free Parameter	N.A		
7.6.2	Free Parameter	N.A		
7.6.3	HC Pump Overrun DHW	N.A		
7.8 Error History				
7.8.0	Last 10 Errors			
7.8.1	Reset Error List	OK = YES ESC = NO		
7.8.2	Last 10 Errors 2	This menu is only visible if there is a second Zone Manager on the BUS configured for managing zones 4-5-6.		
7.8.3	Reset Error List 2	OK = YES ESC = NO This menu is only visible if there is a second Zone Manager on the BUS configured for managing zones 4-5-6.		
7.9 Reset Menu				
7.9.0	Reset Factory Settings	OK = YES ESC = NO		
8. SERVICE PARAMETERS				
8.0 Boiler statistics - 1				
8.0.0	Diverter Valve	Number of diverter valve cycles (n x 10)		
8.0.1	Pump	Time of circulator on (h x 10)		
8.0.2	Pump	Number of boiler circulator cycles (n x 10)		
8.0.3	Boiler Lifetime	Boiler Life Time (h x 10)		
8.0.4	Fan	Time of Fan On (h x 10)		
8.0.5	Fan	Number of Fan Cycles (n x 10)		
8.0.6	Burner CH	Number of Flame Detection in CH (n x 10)		
8.0.7	Burner DHW	Number of Flame Detection in DHW (n x 10)		
8.1 Boiler statistics - 2				
8.1.0	Burner On CH	Hours Burner ON CH (h x 10)		
8.1.1	Burner On DHW	Hours Burner ON DHW (h x 10)		
8.1.2	Ignition	Number of Flame Faults (n x 10)		
8.1.3	Ignition	Number of Ignition Cycles (n x 10)		
8.1.4	CH Demand	Heat Request Duration (h x 10)		
8.2 Boiler				
8.2.1	Fan Status	0 = OFF 1 = ON		
8.2.2	Fan Speed	Number of revolutions (rpm)		
8.2.4	Diverter Valve Position	Position of the diverter valve 0 = DHW 1 = CH		
8.2.5	DHW Flow Rate	(l/min)		
8.2.7	Pump Modulation	PWM (%)		
8.2.8	Gas Power	Actual boiler power based on fan revolutions (kW)		
8.2.9	System Pressure	Heating Circuit Pressure (bar)	(only visualisation)	

Parameter number	Name	Description	Range	Factory Setting
8.3 Boiler temperature				
8.3.0	CH T-Set	Actual boiler calculated CH Target (°C)		
8.3.1	CH Flow Temperature	Boiler Flow Temperature (°C)		
8.3.2	CH Return Temperature	Boiler Return Temperature (°C)		
8.3.3	DHW Temperature	DHW Flow T (°C)		
8.3.4	Flue Gas Temperature	Exhausts Flue T (°C)		
8.3.5	Outside Temperature	Outdoor T (°C)		
8.4 Storage				
8.4.2	DHW Inlet Temperature	DHW Inlet T (°C)		
8.5 Service				
8.5.0	Months to Next Maintenance	Months to go before next Maintenance warning comes up	0-60	12
8.5.1	Maintenance Warning Active	Switch on or of the maintenance warning 0 = OFF 1 = ON	0 - 1	0
8.5.2	Maintenance Warning Reset	Reset the maintenance warning in the display and the timer	0 - 1	
8.5.4	Number of the Software Version Interface			
8.5.5	Number of the Software Version Main			
8.6 Error History				
8.6.0	Last 10 Errors	Overview of the last 10 errors occurred		
8.6.1	Reset Error List	OK = Yes BACK = No		
8.7 Free Parameter				
8.7.5	Ionization Current (uA)			
8.7.6	Safety Flame Sensor	Burner status of the boiler 0 = OFF 1 = ON	0 - 1	0
8.7.7	CH Flow Switch State	0 = OFF 1 = ON (used for Regular boiler only)	0 - 1	0
8.7.8	Boiler Power (%)	(% of gas power output)		
14. SETTINGS ZONE 4 (SEE ZONE 1 CHAPTER 4)				
15. SETTINGS ZONE 5 (SEE ZONE 1 CHAPTER 4)				
16. SETTINGS ZONE 6 (SEE ZONE 1 CHAPTER 4)				
21. ZONE MANAGER LIGHT (ONLY VISIBLE IF USING A ZONE MANAGER LIGHT)				
21.1 Wired Multizone Kit 1 - Test				
21.1.0	Manual Mode Activation	OFF - ON		
21.1.1	Out1 Control	OFF - ON		
21.1.2	Out2 Control	OFF - ON		
21.2 Wired Multizone Kit 2 - Test				
21.2.0	Manual Mode Activation	OFF - ON		
21.2.1	Out3 Control	OFF - ON		
21.2.2	Out4 Control	OFF - ON		
21.3 Wired Multizone Kit 3 - Test				
21.3.0	Manual Mode Activation	OFF - ON		
21.3.1	Out5 Control	OFF - ON		
21.3.2	Out6 Control	OFF - ON		
21.4 Wired Multizone Kit - Diagnostics				
21.4.0	Out1 Status	OFF - ON		
21.4.1	Out2 Status	OFF - ON		
21.4.2	Out3 Status	OFF - ON		
21.4.3	Out4 Status	OFF - ON		
21.4.4	Out5 Status	OFF - ON		
21.4.5	Out6 Status	OFF - ON		

Range rating the ATAG iSeries boilers

- 1

Access the Technical Area as per the picture below.
- 2


Select Complete Menu and then number 2 Boiler parameters.
- 3

Go to parameter 2.3 Central Heating 1, then 2.3.1 Max CH Adjustable, which is the range rating setting.
- 4

Set the range required per the chart opposite by turning the dial and pressing OK to save.
- *Note the range is calculated in percentage and varies between the types of boilers.
- 5

Once saved, press the Back button until at the home screen.

To gain access to the technical menu follow these steps:



1

From the controller Home screen, press the **BACK** and **OK** buttons at the same time for 7 seconds.

2

Turn the selector wheel to highlight **007** as the Technical Code. Press **OK**.

3

The screen below then appears with the options:
Language, date and time
Complete Menu
Configuration Wizard
Service
Faults

Technical area

Language, date and time

Complete Menu

Configuration Wizard

Service

Faults

Insert Code

Insert technical code

007

Save

32

33

iS System and iR Regular boilers

MODEL	BOILER PERCENTAGE TO kW										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
15.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0
18.0	5.0	6.3	7.6	8.9	10.2	11.5	12.8	14.1	15.4	16.7	18.0
24.0	5.0	6.9	8.8	10.7	12.6	14.5	16.4	18.3	20.2	22.1	24.0
32.0	6.9	9.4	11.9	14.4	16.9	19.5	22.0	24.5	27.0	29.5	32.0
40.0	6.9	10.2	13.5	16.8	20.1	23.5	26.8	30.1	33.4	36.7	40.0

iC Combination boilers

MODEL	BOILER PERCENTAGE TO kW										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
24.0	5.0	6.9	8.8	10.7	12.6	14.5	16.4	18.3	20.2	22.1	24.0
28.0	5.0	6.9	8.8	10.7	12.6	14.5	16.4	18.3	20.2	22.1	24.0
36.0	6.9	9.4	11.9	14.4	16.9	19.5	22.0	24.5	27.0	29.5	32.0
40.0	6.9	9.4	11.9	14.4	16.9	19.5	22.0	24.5	27.0	29.5	32.0

iC Economiser boilers

MODEL	BOILER PERCENTAGE TO kW										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
27.0	5.0	6.9	8.8	10.7	12.6	14.5	16.4	18.3	20.2	22.1	24.0
35.0	6.9	9.4	11.9	14.4	16.9	19.5	22.0	24.5	27.0	29.5	32.0
39.0	6.9	9.4	11.9	14.4	16.9	19.5	22.0	24.5	27.0	29.5	32.0

Annual Service reminder

This function allows a warning message to come up when the annual service is now due. The message will come up on the screen at a given time interval (months) that an installer has set in the boiler e.g. 12 months. This annual service reminder can also display the installers name and phone number display on the boiler if it has been entered.

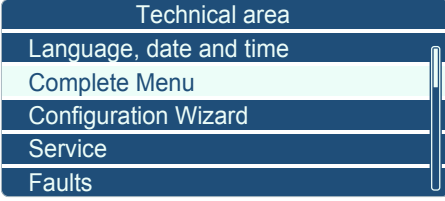
1 From the controller Home screen, press the **BACK** and **OK** buttons at the same time for 7 seconds



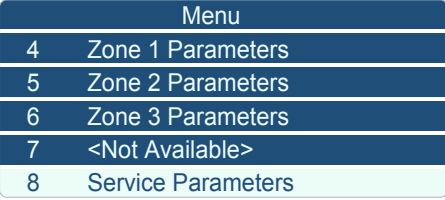
2 Turn the selector wheel to highlight **007** as the Technical Code. Press **OK** to Save.



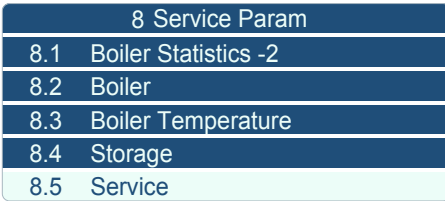
3 Turn the selector wheel to highlight **Complete Menu**. Press **OK**.



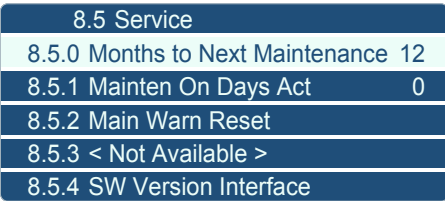
4 Then, turn the selector wheel to **8 Service Parameters**. Press **OK**.



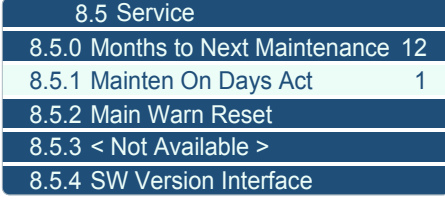
5 Next, turn the selector wheel to **8.5 service**. Press **OK**.



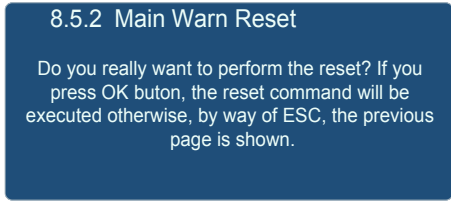
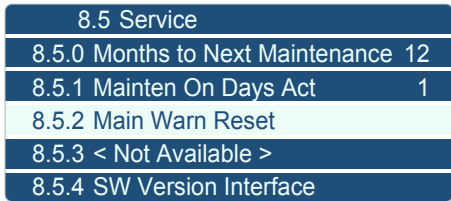
6 **8.5.0 Months to next Maintenance** should be set to 12, for 12 months.



7 **8.5.1 Maintenance on Days Act**, this should be selected to 1, so the maintenance reminder comes up after the selected months period. If set to zero, then it will be set to off and no reminder will operate.



8 When the warning message comes up that the annual service is due, it can be reset by selecting **8.5.2**. This will reset the service reminder when a Gas Safe registered engineer has serviced the boiler. This will reset it to the selected months period from when actioned.



9 The boiler can also hold the installer's company name and phone number. So, when the annual service reminder comes up the installer detail will also show if that function has been set up.



ATAG
One^{zone}
If the customer has a **ONE^{Zone}** controller, it also displays the scheduled maintenance is due on the screen. It will not go until the maintenance warning reset 8.5.2 is carried out on the boiler.

Setting up installer details to display on boiler

This function allows you to have an installers name and phone number displayed on the boiler when the annual service is due (if service maintenance reminder function is enabled) or when some faults occur.

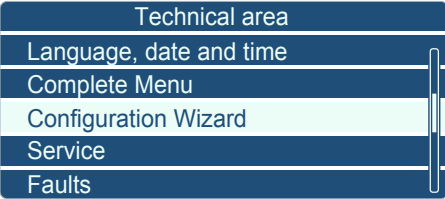
1 From the controller Home screen, press the **BACK** and **OK** buttons at the same time for 7 seconds.



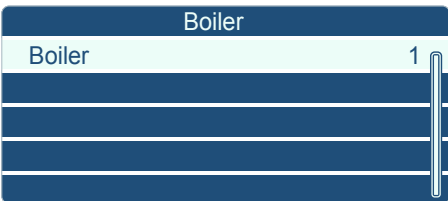
2 Turn the selector wheel to highlight **007** as the Technical Code. Press **OK** to Save.



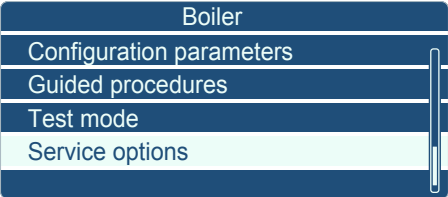
3 Turn the selector wheel to highlight **Configuration wizard**. Press **OK**.



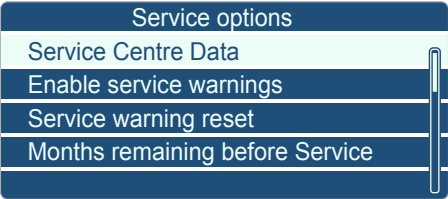
4 Select device, select **Boiler 1**.



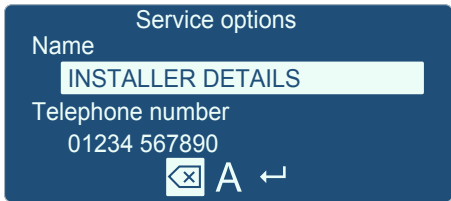
5 The next screen Boiler, select **Service options**.



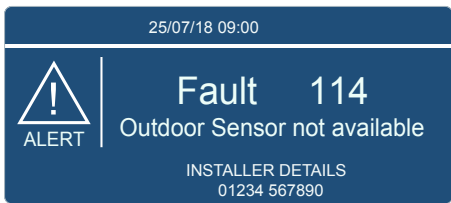
6 The next screen **Service options**, select **Service Centre Data**.



7 In the service options screen you can enter a **Company name** and **phone number**. These details will show up when the annual service is due (if service maintenance reminder function is enabled) or when some faults occur.



8 Example of fault with installer details.



Gradient speed CH

The gradient allows the boiler to increase the CH water temperature with a pre-set (parameter 2.0.6) number of degrees per minute. The number of degrees can be set between 1 and 15 per minute (factory set to 5 (NG) or 0 (LPG)).

The Gradient control is a calculated increase of the T-Set value. When the flow temperature is 5 degrees higher than the T-set temperature, the boiler will switch off. So, if you set the max flow temperature to 80 the boiler will switch off at 85.

Scenario:
Boiler set with parameter (2.0.6) with a gradient speed CH of 5 = 5°C per minute increase. CH T-max 80°C

If the boiler starts with 35°C flow temperature the boiler will calculate a T-set temperature using the gradient line. This will look to raise the flow temperature to 40°C after 1 minute and look to raise it a further 5°C the minute after, as an on ongoing gradient line, which is recalculated as the boiler is working. If the boiler goes past this gradient line T-set temperature by more than 5°C the boiler will switch off. The boiler 5 minute anti-cycle feature will operate. When the boiler comes back on again it will start the process off again with the new flow temperature.

A boiler / system that cannot get rid of this heat effectively will see a rapid increase in the flow temperature (more than the 5°C per minute it has been set up to do). The flow temperature will quickly go over the calculated T-set temperature (gradient) by the 5°C and would switch off.

The following gradient speed settings are recommended for each type of heating system:
1 – 2 underfloor heating
4 – 5 Radiator convectors
7 – 8 Indirect heated air heater

Setting the gradient parameter to 2.0.6 = 0

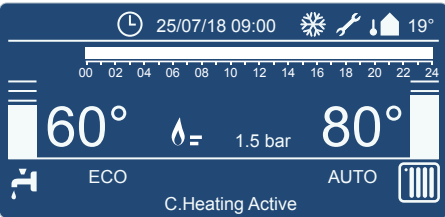
If you set this to 0, you switch off the gradient control and there is no limit to the number of degrees temperature increase per minute.


The boiler will try to reach its set point as quickly as possible (The brake is off) and modulate to as per the temperature and flow requirements of the system whilst maintaining the delta T.


Note – Flow is prioritised over delta T to ensure a low as possible return temperature and increase the boilers opportunity to condense whilst only using the power required for the system.


2.6. General	Name	Description	Unit	Range	Default
2.0.6	T-Gradient	Gradient Function	°C/min	0 - 15	5 (NG) 0 (LPG)



Controls and explanation of the functions



Central heating system
The CH program is always active after start-up. This is indicated by a rad symbol .

If there is heat request, it is indicated by a square around the rad symbol  and the description at the bottom of the screen of 'C.Heating Active'.

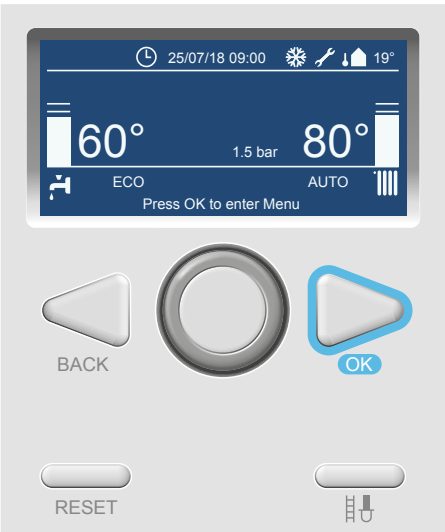
The heating will be put into operation. The circulation pump will switch on and the burner will switch on after approximately 15 seconds (flame icon .

When there is no more heat requested the radiator symbol  may have the square around it or not, but the flame (flame icon)  symbol will disappear. The pump will continue to run for 60 seconds due to the pump over run feature. No description is displayed to show the pump overrun is operating.

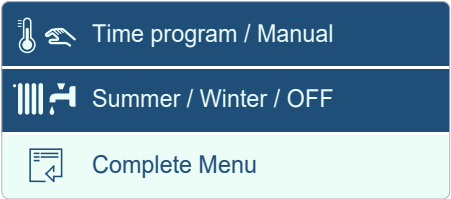
Change the central heating setpoint temperature

To start: Press any button to wake up the display

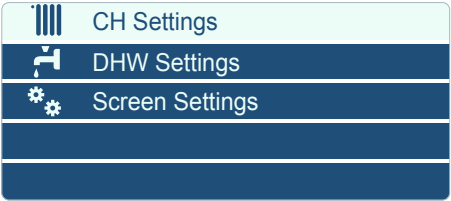
1 From the controller Home screen, press **OK**.



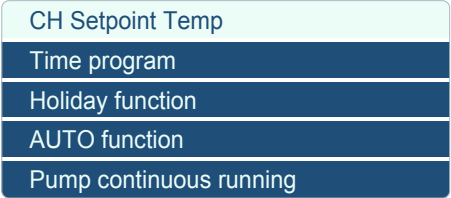
2 Turn the selector wheel to highlight **Complete Menu**. Press **OK**.



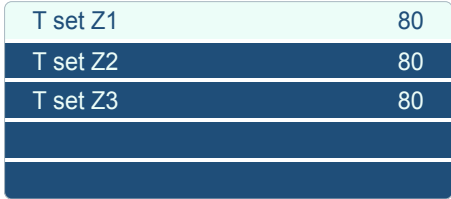
3 CH Settings is highlighted. Press **OK**.



4 Option **CH Setpoint Temp** is highlighted. Press **OK**.

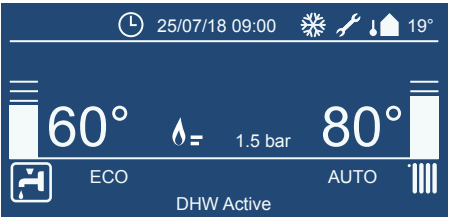





5 Option T set Z1 is highlighted. Press **OK**.



Note: T set Z2 and T set Z3 are inactive functions.

6 Turn the selector wheel until the desired temperature appears on the screen. Press **OK**.
Available temperature settings: 20°C - 80°C



Hot water supply
The DHW program is always active after start-up. This is indicated by a tap symbol .
If there is a hot water request, this is indicated by a square around the tap symbol  and the description at the bottom of the screen of 'DHW Active'. The hot water supply will be activated. The circulation pump will start circulating and the burner will switch on (flame icon) .
The pump will continue to run for 30 seconds due to the pump over run feature. No description is displayed to show the pump overrun is operating.

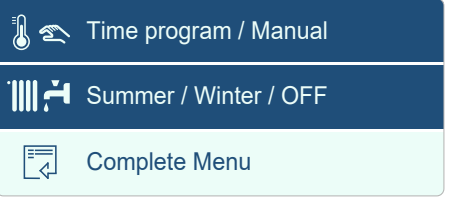
Change the domestic hot water setpoint temperature

To start: Press any button to wake up the display

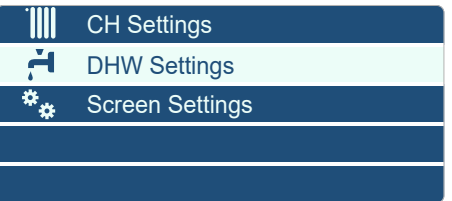
1 From the controller Home screen, press **OK**.



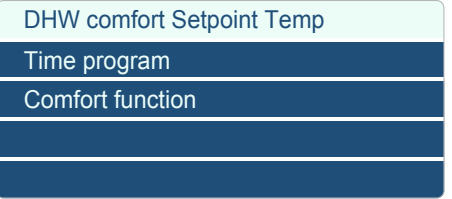
2 Turn the selector wheel to highlight **Complete Menu**. Press **OK**.



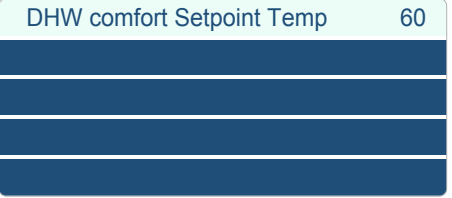
3 Turn the selector wheel to highlight **DHW Settings**. Press **OK**.



4 Option **DHW Comfort Setpoint Temp** is highlighted. Press **OK**.

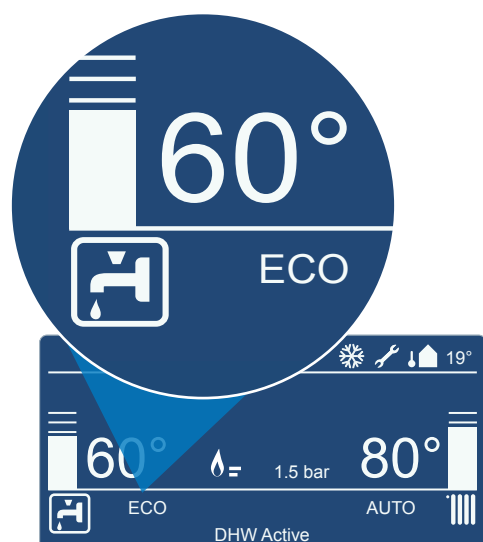


5 The current DHW comfort Setpoint temperature is displayed. Press **OK**.



6 Turn the selector wheel until the desired temperature appears on the screen. Press **OK**.
Available temperature settings: 40°C - 65°C





Comfort and eco

ECO and **COMFORT** are the hot water preheat settings, **COMFORT** for **ON** or **ECO** for **OFF**. By default the hot water supply is set to **ECO**.

COMFORT mode is a domestic hot water setting that enables the boiler to preheat the hot water to the setpoint temperature. This enables quicker delivery of hot water to hot water fixtures.

ECO mode will result in a longer DHW waiting time to the fixtures as the boiler will not fire up to pre heat the hot water supply.

By default the hot water supply is set to **ECO** and **COMFORT** mode is disabled (turned off). To enable (turn on) **COMFORT** mode, follow the steps below.

COMFORT MODE HAS THREE OPTIONS:

Option 1: Always Active

This option provides continuous hot water all day long. The boiler maintains the primary heat exchanger temperature to quickly deliver hot water to the plate heat exchanger. This selection provides the quickest delivery of hot water to hot water taps, but uses the most energy (**COMFORT** mode will be displayed on the home screen).

Option 2: Time Based

The boiler maintains the primary heat exchanger temperature based on the time selections. This selection requires more energy use than when disabled, but not as much energy use as the “Always Active” option (**COMFORT** or **ECO** with a time clock logo will be displayed on the home screen depending which mode it is in). ⌚

Option 3: Disabled

The boiler operates and produces hot water; however, it will not maintain the primary heat exchanger temperature for quicker hot water production. This selection saves some energy, but requires a longer time to provide hot water to the hot water taps (**ECO** mode will be displayed on the home screen).

Always Active

In always active mode **COMFORT** will be displayed continuously on the front display. To enable the Always Active comfort mode setting, Follow the steps below.

To start: Press any button to wake up the display

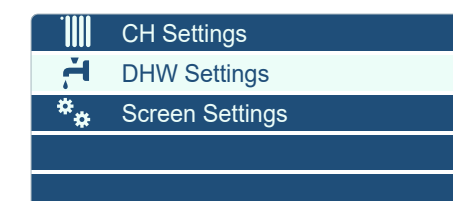
- 1 From the controller Home screen, press **OK**.



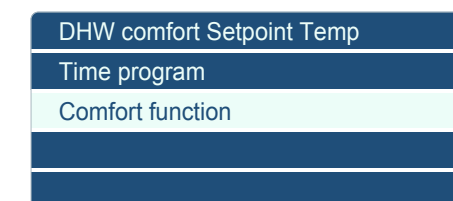
- 2 Turn the selector wheel to highlight **Complete Menu**. Press **OK**.



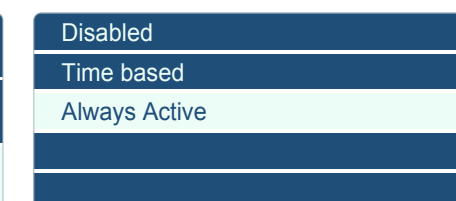
- 3 Turn the selector wheel to highlight **DHW Settings**. Press **OK**.



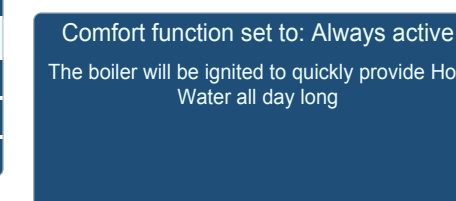
- 4 Turn the selector wheel to highlight **Comfort function**. Press **OK**.



- 5 Turn the selector wheel to highlight **Always Active**. Press **OK**.



- 6 The message in the screen appears. The **Always Active** mode is now selected.



Time Based

When setting the hot water times (all models) in time based mod, a clock icon ⌚ is displayed next to the ECO or COMFORT on the front screen to indicated this time based mode. To enable the **Time Based** comfort mode setting, follow the steps below.

To start: Press any button to wake up the display

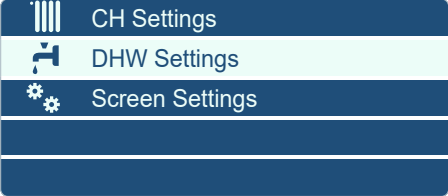
1 From the controller Home screen, press **OK**.



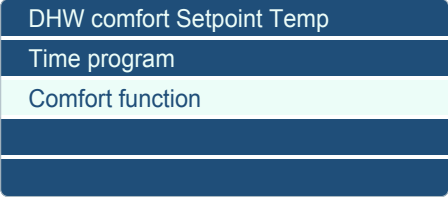
2 Turn the selector wheel to highlight **Complete Menu**. Press **OK**.



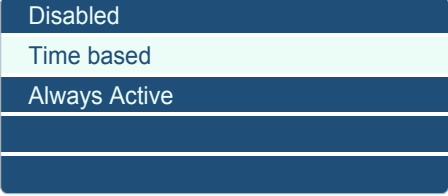
3 Turn the selector wheel to highlight **DHW Settings**. Press **OK**.



4 Turn the selector wheel to highlight **Comfort function**. Press **OK**.



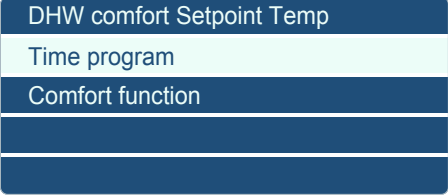
5 Turn the selector wheel to highlight **Always Active**. Press **OK**.



6 The message in the screen appears. The **Time Based** mode is now selected.



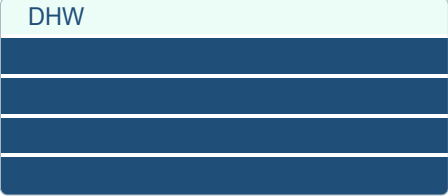
7 Press the **BACK** button one time. Turn the selector wheel to highlight **Time program**. Press **OK**.



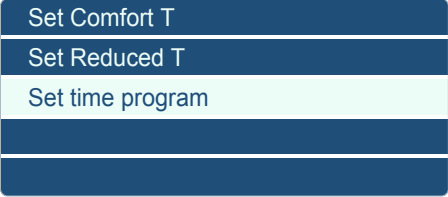
8 Select one of the two options: **Free Time Programming** - User defined times for when comfort is active **Preset programs** - options for preset times for comfort mode to be active.



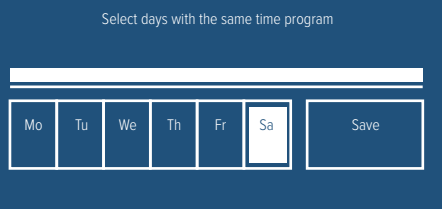
9 **DHW** is highlighted. Press **OK**.



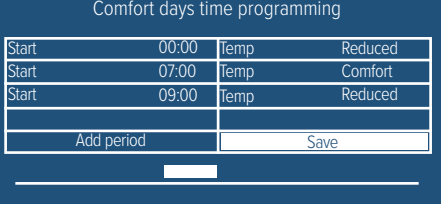
10 Turn the selector wheel to highlight **Set time program**. Press **OK**.



11 You then select the days with the same time program. Use the selector wheel to scroll to the day(s) you want the same. Select **OK** on each day that will have the same schedule.



Highlight all the days you want to set with the same on/off times. Like Monday – Friday or all week. Then press **Save**.



This screen is where you can have the hot water preheat start from 00:00 (midnight) with an off period (shown as Reduced) to the 07:00 where the hot water is set to an on period (shown as Comfort).

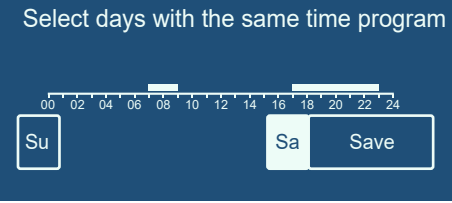
The preheat will then switch off again at 9am as set to Reduced.

The settings for the rest of the day can be input by selecting Add period. When finished select **Save**.

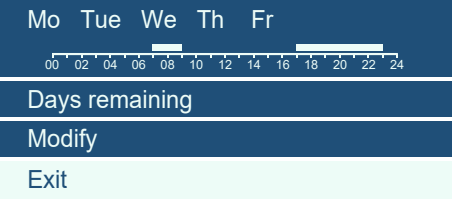
12 The screen then shows **Days remaining**.



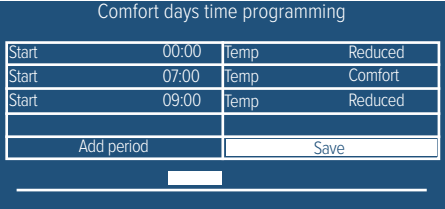
13 The days remaining will then ask what days do you want the same time program.



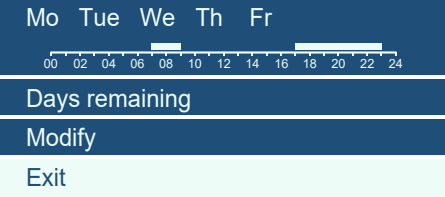
14 The next selection choice is **Modify** to go back into the time settings.



15 This allows you to modify the settings that you have entered if required. Press **Save** when finished.



16 Once all time settings are done, select **Exit** to return to the time programming options screen. Press the back button a few times to get back to the front screen.



Disabled

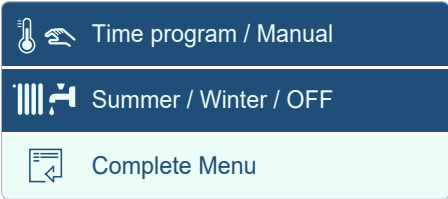
In disabled mode **ECO** will be displayed continuously on the front display.
To enable Disabled (factory setting) comfort mode setting, follow the steps below.

To start: Press any button to wake up the display

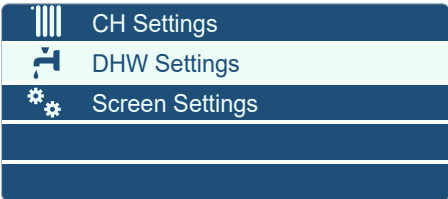


1 From the controller Home screen, press **OK**.

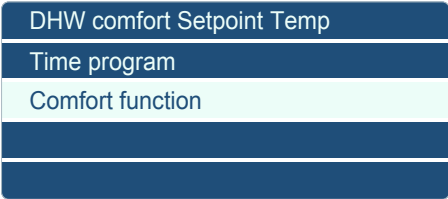
2 Turn the selector wheel to highlight **Complete Menu**. Press **OK**.



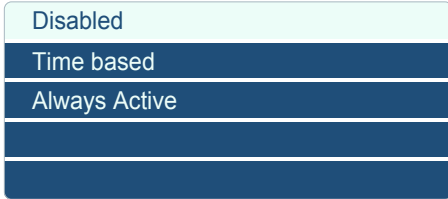
3 Turn the selector wheel to highlight **DHW Settings**. Press **OK**.



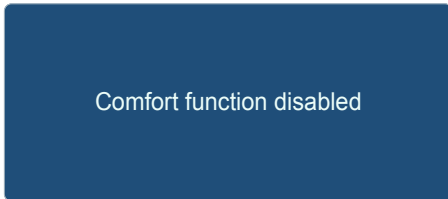
4 Turn the selector wheel to highlight **Comfort function**. Press **OK**.



5 Option **Disabled** is highlighted. Press **OK**.



6 The message in the screen appears. Comfort mode is now disabled.



Thermal Cleanse Function

The Thermal Cleanse Function is ATAG's anti-legionella program built in to the i series range of system and regular boilers to help prevent the growth of the harmful legionella bacteria.

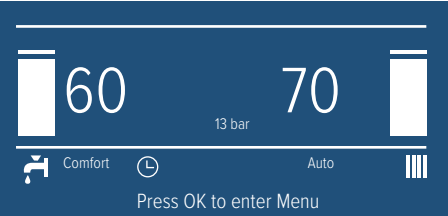
Legionella bacteria grows where the storage temperature is between 20°C to 45°C, so the Health and Safety Executive advises that hot water should be stored at 60°C. This is of course not always practical for the consumer so the Thermal Cleanse Function can be set to conduct a thermal cleanse of the cylinder at regular intervals where the cylinder temperature will reach 65°C to kill off any harmful legionella bacteria before returning to normal hot water functionality.

Note The function can only operate when using the ATAG Hot Water Priority kit (3 port valve and cylinder sensor) where the boiler parameters must be set correctly. The function can be set to operate at regular intervals between 0 and 480 hours.

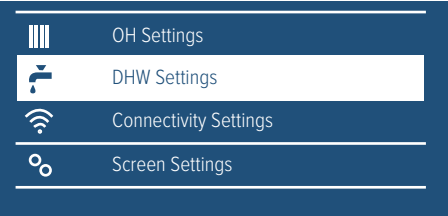
Once the ATAG hot water priority kit and controls have been installed, switch the boiler on. Once the boiler has completed its device discovery it will automatically set the boiler up for the NTC sensor and hot water priority function in parameter 2.2.8 and the Thermal Cleanse Function is active as per factory settings.

To adjust and set the thermal cleanse function follow these steps:

1 From the home Screen, press the **OK** button twice to access the customer menu.

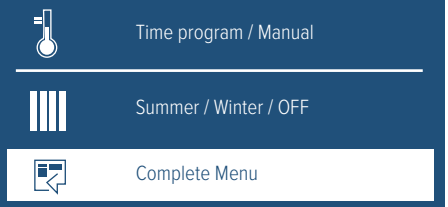


3 Use the dial to select DHW Settings. Press **OK**.

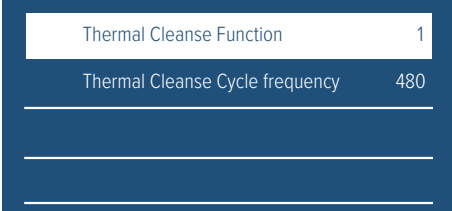
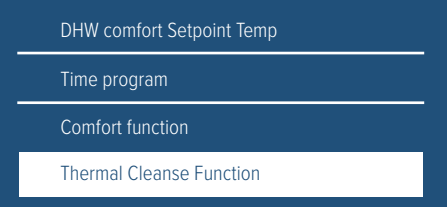


5 The display will show two options, Thermal Cleanse Function and Thermal Cleanse Cycle Frequency. The Thermal Cleanse function will show either a 0 for off or a 1 for on, the Thermal Cleanse Cycle Frequency shows the time between cycles in hours. Use the dial to select the appropriate option and press **OK** and follow the guidance below to set or change each option.

2 When in the customer menu, use the dial to select Complete menu. Press **OK**.



4 Use the dial to select Thermal Cleanse Function. Press **OK**.



- 6

To amend to frequency of the Thermal Cleanse Function, use the dial to select Thermal Cleanse Cycle Frequency. Press **OK**.
- 8

To turn off the Thermal Cleanse Function, use the dial to change the value to 0 and press **OK**.
- 10

Once completed press the **back** button until at the home screen again.

Thermal Cleanse Function

1

Thermal Cleanse Cycle frequency

480

Thermal Cleanse Function

Enable or disable thermal cleanse function

0

Press OK to Confirm

7

Use the dial to amend the number of hours between each cycle. Press **OK**.

9

The display will now show the new settings. ***Please note*** If the value is 0 for the Thermal Cleanse Function, the hours in the Thermal Cleanse Cycle Frequency will not matter as this will not function.

Thermal Cleanse Cycle frequency

Modify the value of thermal cleanse cycle frequency

300 h

Press OK to Confirm

Thermal Cleanse Function

1

Thermal Cleanse Cycle frequency

300

Frost protection - the danger of frost

If there is danger of frost damage to the CH installation and there is no outside sensor connected, it is advisable to let the pump run continuously. If the pump is set to continuously this is displayed by a solid frost symbol (frost icon)❄️.

To set pump to continuously on, proceed as follows:

To start: Press any button to wake up the display

1

From the controller Home screen, press **OK**.

2

Turn the selector wheel to highlight **Complete Menu**. Press **OK**.

4

Turn the selector wheel to highlight **Pump continuous running**. Press **OK**.

3

CH Settings is highlighted. Press **OK**.

5

Turn the selector wheel to highlight **Enable**. Press **OK**.

❄️

Time program / Manual

🏠

Summer / Winter / OFF

📄

Complete Menu

🔧

CH Settings

🚰

DHW Settings

⚙️

Screen Settings

CH Setpoint Temp

Time program

Holiday function

AUTO function

Pump continuous running

Pump continuous running

Disabled

Enabled

❄️

If the pump is set to continuously running the frost icon is displayed.

THERE ARE TWO TYPES OF FROST PROTECTION INTEGRATED IN THE BOILER, FROST PROTECTION OF THE BOILER AND FROST PROTECTION OF THE INSTALLATION.

Boiler frost protection

The boiler frost protection is based on the water temperature measured by the flow T1 sensor in the heat exchanger. When the measured T1 temperature gets below 8°C in the boiler, the boiler pump starts for 2 minutes and the 3-way valve will switch 1 minute to CH and 1 minute to DHW. if the T1 temperature has descended < 4°C the pump will run and the burner will be started on low load for 30 seconds, when T1 temperature is > 8°C, burner will be switched OFF.

DHW frost protection: If the cylinder temperature is below 8°C the burner will be started and stops when temperature reaches 12°C. In this mode the frost symbol (frost icon) will flash.

Installation frost protection

For this type of protection an outside sensor must be connected, if no outside sensor is connected the installation frost protection is not active.

When the outside sensor measures a temperature between 1.5°C and -4°C the boiler pump will come on for 10 minutes every 6 hours. When the outside temperature gets to -5°C or lower the pump will run continuously.

When the outside temperature gets above 1.5°C again, the installation frost protection is off. In this mode the frost symbol (frost icon) will be continuously on solid.

46

47

Combi boiler CH mode

CH controls
With a demand from the heating controls after DHW demand, the boiler activates its 1 minute delay period. This is to prevent the heat exchanger from losing its heat too quickly in the event of a hot water demand. Then the pump starts and after 30 seconds the gradient control becomes active and the boiler fires up. The starting point of the gradient control is the currently existing flow temperature. A Delta-T control (25K) ensures a stable control according to heat request.

If the flow temperature is below the T-set value of 20°C the boiler will immediately start. If during a demand from the heating the burner switches off, because the desired flow temperature is exceeded, there will be an anti-cycle time in operation for 5 minutes.

This means that the burner switches on again after 5 minutes if there is still a demand from the heating.

Combi boiler DHW mode

DHW controls (combination boilers)
If a hot water tap is opened the flow sensor measures (F1) the amount drawn off. Depending on the desired DHW temperature and volume the controls will calculate an output. This realises the desired water temperature in an efficient way.

The hot water sensor (T3) will adjust any minor deviations caused by temperature fluctuations so that even under these circumstances the desired temperature is constant.

System & regular boiler central heating mode

CH controls
With a demand from the heating controls, the boiler activates its 1 minute delay period. This is to prevent the heat exchanger from losing its heat too quickly in the event of a hot water demand.

Then the pump starts and after 30 seconds the gradient control becomes active and the boiler fires up. The starting point of the gradient control is the currently existing flow temperature. A Delta-T control (25K) ensures a stable control according to heat request.

If the flow temperature is below the T-set value of 20°C the boiler will immediately start. If during a demand from the heating the burner switches off, because the desired flow temperature is exceeded, there will be an anti-cycle time in operation for 5 minutes.

This means that the burner switches on again after 5 minutes if there is still a demand from the heating.

Setting up integral and external controls options

Some boiler settings may need changed depending on what controls you are using.

If you are just connecting a control that is working with the volt free On/Off, OpenTherm or 230V SwL connection, then there are no changes as this is the factory default set up. So, you can just plug in and play.

If you are using an ATAG ONE^{Zone}, ATAG Cube or outside weather compensator, then you will need to change the ‘Thermoregulation setting’.

This can be done as follows:

To start: Press any button to wake up the screen.

1

From the controller Home screen, press the **BACK** and **OK** buttons at the same time for 7 seconds

2

Turn the selector wheel to highlight **007** as the Technical Code. Press **OK** to Save.

3

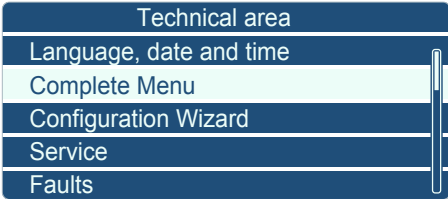
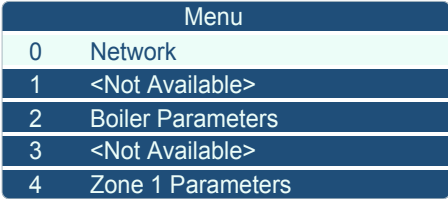


The screen below then appears. Turn the selector wheel to highlight **Complete Menu**. Press **OK**. It takes approximately 10 seconds to load the menu.

4

The screen below appears. This way you have access to the complete parameter level.

5

Now select 4. Zone 1 Parameters
a. Next select 4.2 Z1 Settings
b. Next select 4.2.1 Thermoregulation. Within this parameter of the boiler you can select from 0 – 4. See the table below



No.		Description	Volt Free Connector Colour	Controls
0	=	Fixed flow temperature (On/off or OpenTherm controller) (Factory setting) manual mode 0 = OFF 1 = ON	<div>OT Bus or On / Off</div>	On / Off stat OpenTherm
1	=	Do not use	-	-
2	=	Room control with ATAG ONE ^{Zone} controller (Room temp only / thermostat mode)	<div>Bus T B</div>	ATAG ONE ^{Zone} or Cube
3	=	Weather Compensation (Outside sensor only or with On/off or OpenTherm controller) (4.7.0 & 4.7.2)	<div><div>House Out</div><div>OT Bus or On / Off</div></div>	Outside sensor with On / Off stat or OpenTherm
4	=	Weather dependent control - with Room compensation (Only for ATAG ONE ^{Zone} controllers) (ATAG ONE ^{Zone} in weather dependent mode)	<div>Bus T B</div>	ATAG ONE ^{Zone}

Integral programmer

If you are using the built-in programmer to control the heating times going On and Off then these are the settings to change.

The built-in time program of the boiler display works in two different ways. There is a setting within the customer ‘Complete menu’, ‘Screen Settings’, then ‘Time Program service type’ and there the setting can be changed to either ‘Extended Time Program’ (default) or ‘Program’.

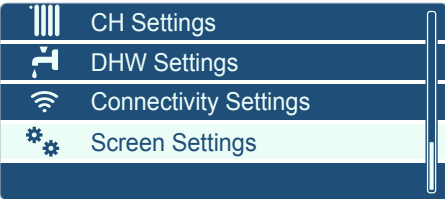
‘Extended Time Program’ (default) would be for the ATAG eBus connect products, like ATAG ONE^{Zone} & ATAG Cube (Thermoregulation setting no.2 & 4), which work with the built-in timer. These time settings are shown in the boiler and within the ATAG ONE^{Zone} app/portal heating schedule.

‘Program’ would be used where the front display integral timer is used for the time setting element with the 230V SwL or Volt free On/Off contacts. (Thermoregulation setting no.0 & 3, including SwL)

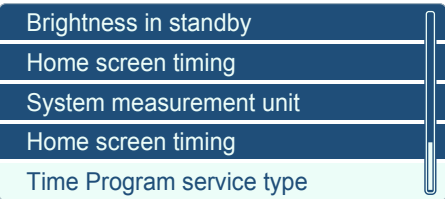
1 Customer Complete Menu



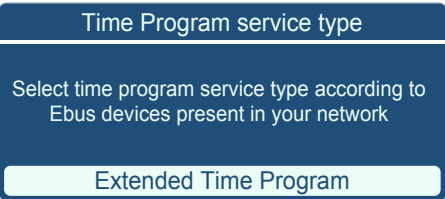
2 Screen Settings



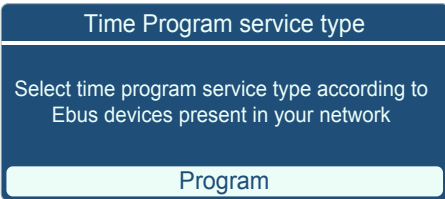
3 Time Program service type



4 Scroll the wheel to select Extended Time Program and press OK to confirm selection.



5 Scroll the wheel to select Program and Press OK to confirm selection.

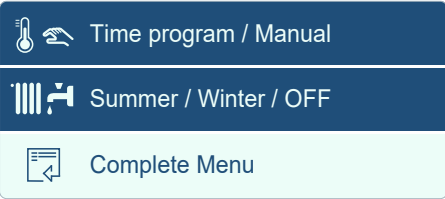


Set the heating time periods (if using integral programmer)

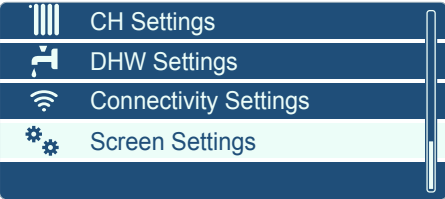
The built-in time program of the boiler needs to be enabled. This change needs to be made in the ‘Time Program service type’ section and changed from the default ‘Extended Time Program’ to ‘Program’.

‘Program’ would be used where the front display built-in timer is used for the time setting element with the 230V SwL or Volt free On/Off contacts. (Thermoregulation setting No.0 & 3, including SwL)

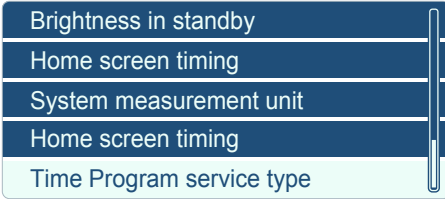
1 Customer Complete Menu



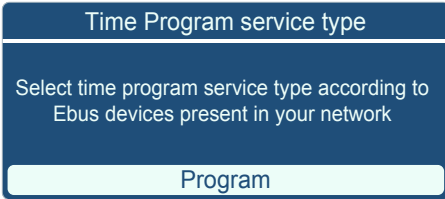
2 Screen Settings



3 Time Program service type



4 Scroll the wheel to select Program and press OK to confirm selection.



If the time program service type is set from ‘Extended Time Program’ to ‘Program’ you will switch from day heating line (contact open) to night heating line (contact closed), which would mean on and off.

If the integral programmer function is not being used then it should be left as the default setting, Extended time program.

To set in time periods

1

From the controller Home screen, press **OK**.

2

Turn the selector wheel to highlight **Complete Menu**. Press **OK**.

3

CH Settings is highlighted. Press **OK**.

4

Option Time program. Press **OK**.

25/07/18 09:00

60°

1.5 bar

80°

ECO

AUTO

Press OK to enter Menu

BACK

OK

RESET

Time program / Manual

Summer / Winter / OFF

Complete Menu

CH Setpoint Temp

Time program

Holiday function

AUTO function

Pump continuous running

CH Settings

DHW Settings

Screen Settings

There are four settings

Free Time Programming

Wizard time programming

Preset programs

Time program/manual mode

Free Time Programming
This is where you can set in your individual time settings for each day.

Wizard time programming
This setting goes through setting up the programming by asking some questions to help decide what to set up.

For example, 'What time do you want to enable rooms heating?' or 'What time do you want the first time slot to end?'

Pre-set programs
This setting has pre-set programs called 'Family program, No lunch program, Middyay program and Always active.

Time program / manual mode
This setting switches between using the time programs that have been set on the boiler or manual mode

Free time programming

When selecting free time programming the next screen gives you a selection of 'All zones' or you can select the individual zone.

1

Most will only have one zone being Zone 1, highlight **Zone 1** and press **OK** to select.

2

Then select **Set time program**

3

Highlight all the days you want to set with the same on/off times. Like Monday – Friday or all week. Then press **Save**.

4

This screen is where you can have the heating start from 00:00 (midnight) with an off period (shown as 15°C) to the 07:00 where the heating is set to an on period (shown as 20°C). The settings for the rest of the day can be put in by selecting **Add period**. When finished select **Save**.

5

The screen then shows **Days remaining**.

6

The days remaining will then ask what days do you want with the same time program.

7

The next selection choice is **Modify** to go back into the time settings.

8

This allows you to modify the settings that you have entered if required. Press **Save** when finished.

9

Once all time settings are done, select **Exit** to return to the time programming options screen. Press the back button a few times to get back to the front screen.

All zones

Zone 1

Zone 2

Zone 3

Set Comfort T

Set Reduced T

Set time program

Su

Mo

Tu

We

Th

Fr

Sa

Save

Comfort days time programming

Start 00:00 Temp. 15.0°

Start 07:00 Temp. 20.0°

Start 09:00 Temp. 15.0°

Start 17:00 Temp. 20.0°

Add period

Save

Su

Sa

Days remaining

Modify

Exit

Select days with the same time program

Su

Sa

Save

Mo

Tue

We

Th

Fr

Days remaining

Modify

Exit

Weather compensation

To set the boiler to weather compensation, please set parameter 4.2.1 to 3 with an ON/OFF or OpenTherm controller or to 4 with an ATAG ONE^{Zone}.

1 Turn the selector wheel to highlight the Parameters Zone you want to set. In this case **Zone 1 Parameters**. Press **OK**.

Menu	
0	Network
1	<Not Available>
2	Boiler Parameters
3	<Not Available>
4	Zone 1 Parameters

2 Turn the selector wheel to highlight **4.2 Z1 Settings**. Press **OK**.

4 Zone Parameters	
4.0	Setpoint
4.1	SW Changeover
4.2	Z1 Settings
4.3	Z1 Diagnostics
4.4	< Not Available>

3 Turn the selector wheel to highlight **4.2.1 Thermoregulation**. Press **OK**.

4.2 Z1 Settings	
4.2.0	Zone temperature range
4.2.1	Thermoregulation
4.2.2	< Not Available >
4.2.3	Offset
4.2.4	< Not Available>

4 Select no. 3 **Outdoor Weather Compensation** (Outside sensor only or with ON/OFF or OpenTherm controller) (4.7.0 & 4.7.2).

4.2.1 Thermoregulation	
3	
Outdoor T Only	
Maximum value	4
Minimum value	0

Setting the weather compensation

To set up the weather compensation, follow the steps below:

1 Turn the selector wheel to highlight the Parameters Zone you want to set. In this case **Zone 1 Parameters**. Press **OK**.

Menu	
0	Network
1	<Not Available>
2	Boiler Parameters
3	<Not Available>
4	Zone 1 Parameters

2 Turn the selector wheel to highlight **4.7 Zone regulation Parameters**. Press **OK**.

4	Zone1 Parameters
4.3	Z1 diagnostics
4.4	< Not Available>
4.5	< Not Available>
4.6	< Not Available>
4.7	Zone Regulation Parameters

3 Turn the selector wheel to highlight **4.7.0 Heating Type**. Press **OK**.

- Make a choice between:
- 0 Underfloor or
 - 1 Radiator or
 - 2 Underfloor (main) + radiator or
 - 3 Radiators (main) + underfloor or
 - 4 Convect or
 - 5 Air heating

Press **BACK** to the **4.7 Zone regulation Parameters** screen.

4.7 Zone Regulation Parameters	
4.7.0	Heating type
4.7.1	Room Influence
4.7.2	Building Insulation Level
4.7.3	Building Size
4.7.4	Climatic Zone

4 Turn the selector wheel to **highlight 4.7.2 Building Insulation Level**. Press **OK**.

- Make a choice between:
- 0 Poor or
 - 1 Average or
 - 2 Good

4.7 Zone Regulation Parameters	
4.7.0	Heating type
4.7.1	Room Influence
4.7.2	Building Insulation Level
4.7.3	Building Size
4.7.4	Climatic Zone

5 Turn the selector wheel to highlight **4.7.3 Building Size**. Press **OK**.

4.7 Zone Regulation Parameters	
4.7.0	Heating type
4.7.1	Room Influence
4.7.2	Building Insulation Level
4.7.3	Building Size
4.7.4	Climatic Zone

- Make a choice between:
- 0 Small or
 - 1 Average or
 - 2 Large

6 Turn the selector wheel to highlight **4.7.1 Room Influence**. Press **OK**.

4.7 Zone Regulation Parameters	
4.7.0	Heating type
4.7.1	Room Influence
4.7.2	Building Insulation Level
4.7.3	Building Size
4.7.4	Climatic Zone

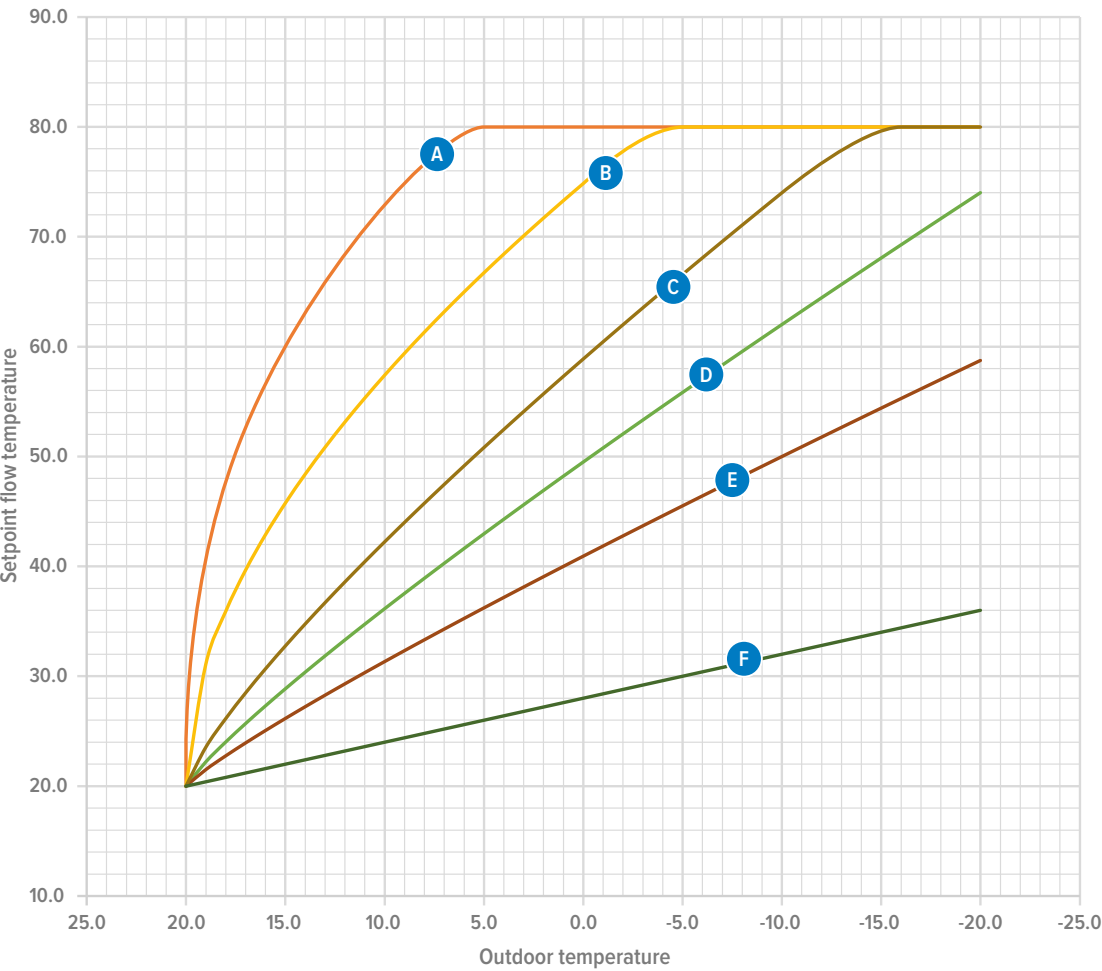
7 Turn the selector wheel to set the **Room Influence 0 OFF**. (0 OFF is the default setting)

4.7.1 Room Influence	
0 OFF	
Maximum value	3
Minimum value	0

- Make a choice between:
- 0 OFF or
 - 1 Less or
 - 2 Medium or
 - 3 Good

Weather compensation settings calculation

All these settings below calculate the ideal heating line for this specific property. For the Heating type, Building Insulation Level and the Building Size.



Thermoregulation offset

Where a ONE^{Zone} controller is fitted the front display gives and thermoregulation offset temperature of ± 14 for high temperature systems and ± 7 for low temperature systems. This offset setting can alter the flow temperature being produced by the boiler by the adjusted amount.

For example

If the boiler has a heat line 'C' which is 'Heating type – Radiators', 'Building insulation level – Average' & 'Building size – Average', then when the outside temperature is 5.0°C the flow temperature will be 51°C. Therefore if the thermoregulation offset was set to +4°C then the adjusted flow temperature will be 55°C.

A	Heating Type	Air heating
	Building Insulation Level	Poor
	Building size	Small
B	Heating Type	Convectors
	Building Insulation Level	Average
	Building size	Average
C	Heating Type	Radiators
	Building Insulation Level	Average
	Building size	Average

D	Heating Type	Radiators (main) + floor
	Building Insulation Level	Good
	Building size	Average
E	Heating Type	Underfloor
	Building Insulation Level	Average
	Building size	Average
F	Heating Type	Underfloor
	Building Insulation Level	Good
	Building size	Average

Routine servicing

ATAG boilers require an annual service to maintain the safety, efficiency, and warranty of the boiler. A full strip down service, where all combustion seals are replaced using an iCon1 or iCon2 maintenance kit, is required every 4 years or where analyser readings are not within correct safety standards.

Required tools:

- Cross head screwdriver
- T-handle key set with 3 bits (hex key 4mm, hex key 5mm and cross head PZ2)
- Open end wrench 8mm
- T10 Torx screwdriver.

Interim Service

For reasons of safety, and economy, it is recommended that the boiler is serviced annually. Servicing must be performed by a competent person in accordance with BS 7967.

After servicing, complete the relevant Service Interval Record section of the Benchmark Checklist located on back pages of the Installation and Servicing Instructions.

In order to perform maintenance, the following actions have to be taken:

- Switch off the electrical power to the boiler
- Remove the screws from the 2 fasteners (A) and (B)
- Unlock the fasteners (A) and (B) and remove the cover in a forward motion

Air box/cover

The cover also doubles as air box:

- Clean the air box/cover with a cloth and a non-abrasive cleaner

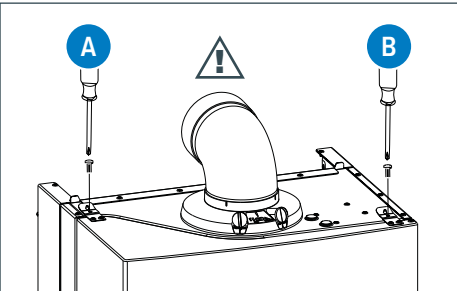
Siphon

The degree of pollution residue in the siphon is an important indication for the need of maintenance

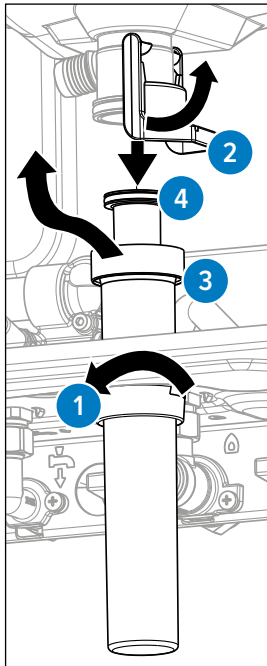
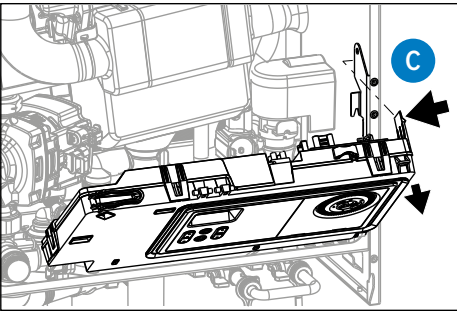
- Turn the control unit forwards by moving the handle (C) slightly to the left
- Turn/pull the sealing ring (1) downwards
- Turn the siphon securing clip (2) anti-clockwise
- Pull the siphon cup (3) and siphon pipe (4) out of the heat exchanger
- Take the siphon cup and pipe out of the boiler by moving it downwards or turn it in forward motion upwards along the heat exchanger
- Clean the parts by rinsing them with water
- Check the O-ring of the siphon cup and replace it if necessary
- Grease the O-ring again with acid-free O-ring grease to simplify the reassembly

Reassembly takes place in reverse order

- Fill the siphon with 150 ml of water
- If a leakage has occurred to the siphon, replace the entire siphon



NOTE ALWAYS REFIT AND TURN THE 2 SCREWS TIGHT IN THE FASTENERS A AND B.



Flue gas analysis

Put the boiler back into operation and carry out a flue gas analysis as described on page 22.

Always put back the cover after (maintenance) work and secure it with screws **A** and **B**.

Note: During routine servicing, and after any maintenance or change of part of the combustion circuit, the following must be checked: -

Checking the CO₂ /O₂

Check the CO₂ readings at full load and low load as described on page 22.

Checking flue integrity

The integrity of the complete flue system and the flue seals by checking air inlet sample to eliminate the possibility of recirculation as described in the installation & servicing instructions.

Checking CO readings and Combustion Performance (CO/CO₂ ratio)

Check CO readings and Combustion Performance as described in the installation & servicing instructions.

The combustion reading (CO/CO₂ ratio) must be less than 0.004. If the combustion reading (CO/CO₂ ratio) is greater than this, and the integrity of the complete flue system and combustion circuit seals has been verified, and the inlet gas pressure and gas rate are satisfactory either:-

- Perform the ‘Full Service’
- Perform ‘Setting the Gas Valve’

Check expansion vessel pressure (every year)

Isolate the boiler by the flow and return valves underneath the boiler. (The 2 outer black handled valves).

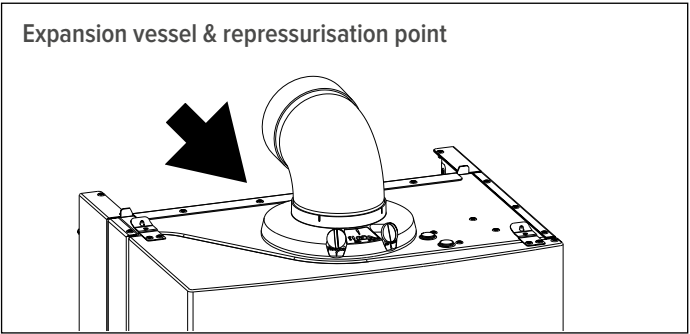
Drain down the boiler and with the boiler still vented remove the dust cap on the boiler expansion vessel. If the boiler is a combi, then remove the diverter valve head. Check the pre-charge pressure of the expansion vessel and re-pressurise in **accordance with the static height of the heating** installation as per the table below. If fitted in a **loft/attic space**, the expansion vessel pre-pressure should be **0.5bar**.

Ensure the drain off is open when re-pressurising the expansion vessel.

INSTALLATION HEIGHT ABOVE THE EXPANSION VESSEL	PRE-CHARGE PRESSURE OF THE EXPANSION VESSEL
5m	0,5 bar
10m	1,0 bar
15m	1,5 bar

Refill boiler and allow boiler to carry out the air purge function for its 7 minutes.

Test expansion vessel re-pressurisation point (Schrader) with leak detection fluid to ensure no pressure is leaking through the Shrader core after this work. If the Shrader core is passing, replace as part of the service.



Note: The vessel can lose some of its charge pressure over time. **Also check whether the installed expansion vessel is adequate for the system water volume.**

Note: If the interior of the boiler looks heavily polluted with dust / dirt, then a full service should be performed even with acceptable combustion readings (CO/CO₂ ratio).

Full Service

For reasons of safety, economy and warranty, it is mandatory that the boiler is serviced annually. Servicing must be performed by a competent person in accordance with BS 7967-4.

A full strip down service using an iCon1 or iCon2 maintenance kit is required every 4 years or where analyser readings are not within correct safety standards..

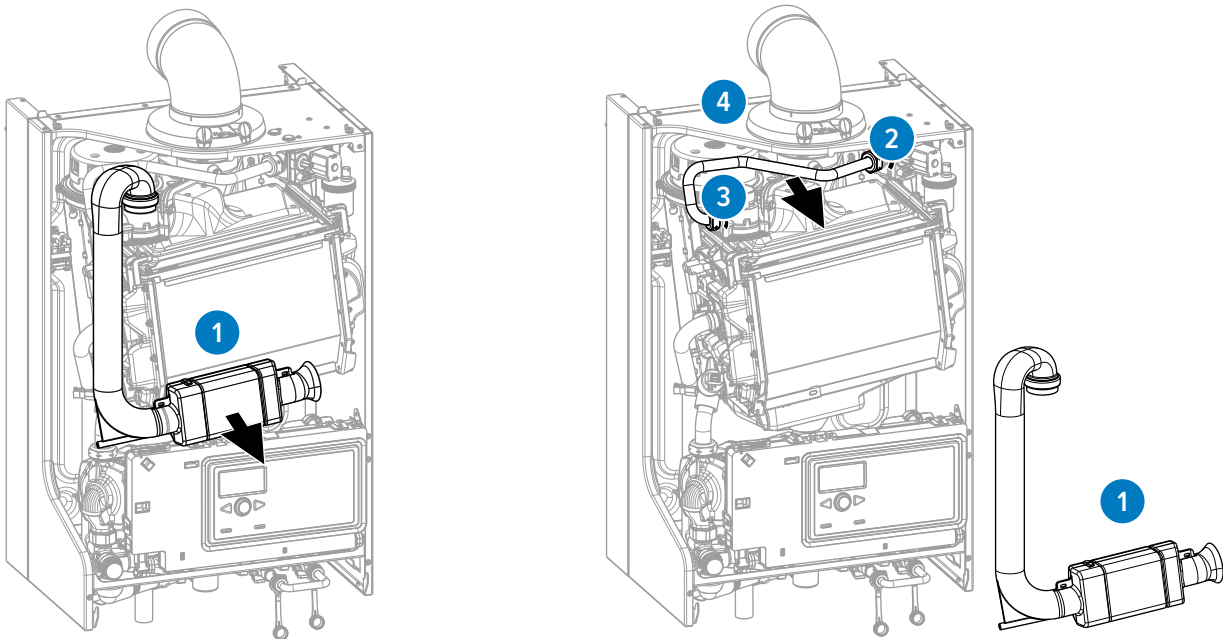
After servicing, complete the relevant Service Interval Record section of the Benchmark Checklist, located on the inside back page of the Installation & Servicing instructions.

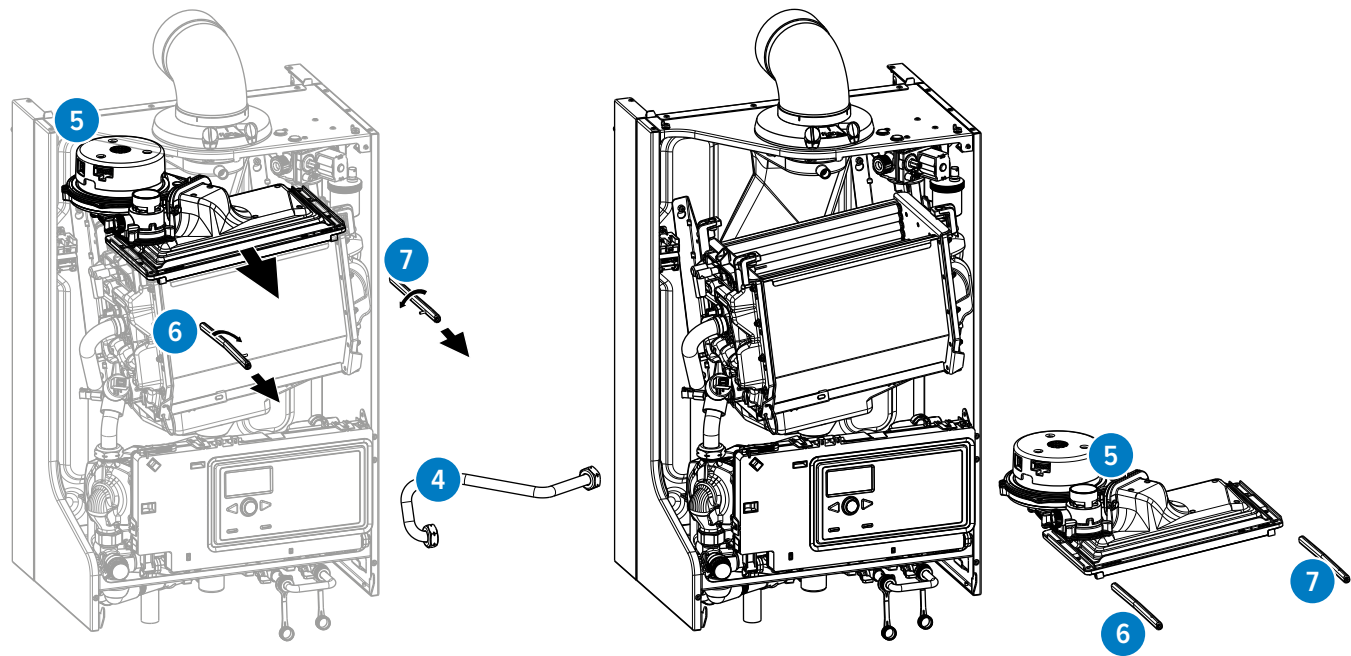
Where a full service is required the following steps must be followed:

Carry out the actions as described in the interim service section.

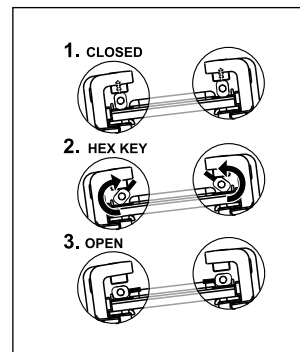
Fan unit and burner cassette

- Remove the Velcro from the silencer and remove the silencer **(1)**
- Unscrew the coupling **(2)** of the gas block and the coupling on the venturi **(3)** and remove the gas line **(4)**



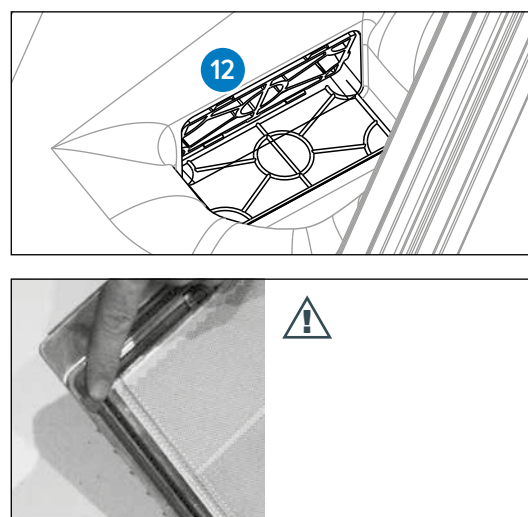
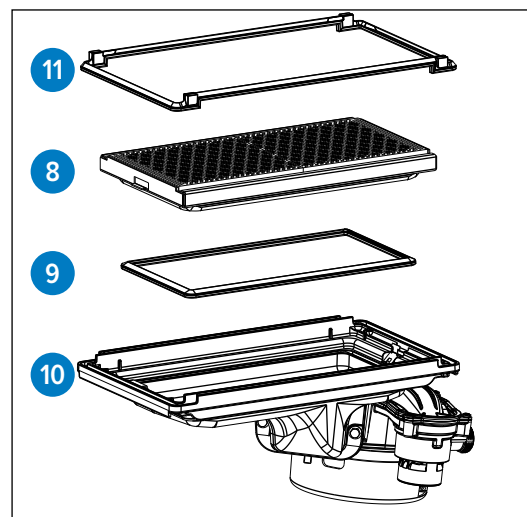


- Disconnect the electrical connections from the fan (5)
- Turn the left (6) and right (7) clamp bars a quarter turn with a 4mm Allen key and pull these out in a forward motion. Mind the direction of rotation (red control cams);
- Now lift the complete fan unit (5) with the upper tray of the heat exchanger and remove it in a forward-motion
- Turn the unit upside down and remove the burner cassette (8) from the ventilator unit
- Check the burner cassette for wear and tear, pollution and any breakages. Clean the burner cassette with a soft brush and vacuum cleaner
- In the case of breakages, always replace the complete burner cassette (8)



The following operations must be performed carefully in relation to the vulnerability of the non return valve.

- After removing the burner cassette (8) the non return valve (12) becomes visible. Check that the non return valve entire circumference closes / seals completely. The valve should be able to move freely from fully open to fully closed. Replace the non return valve if the valve does not seal properly.

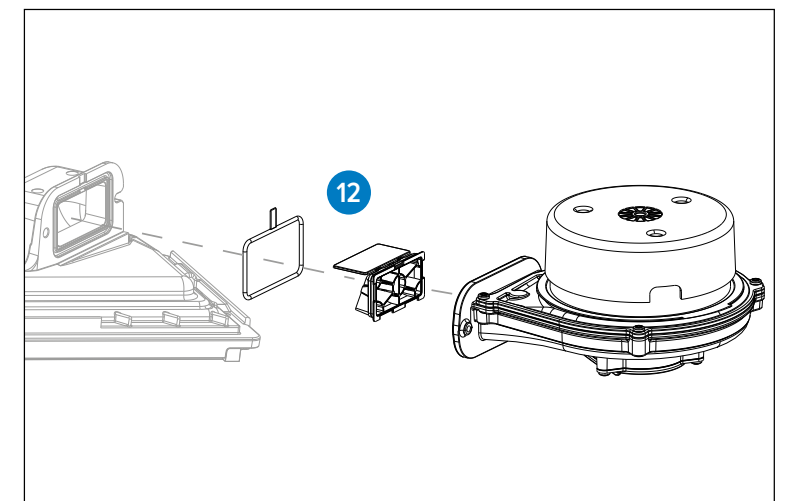
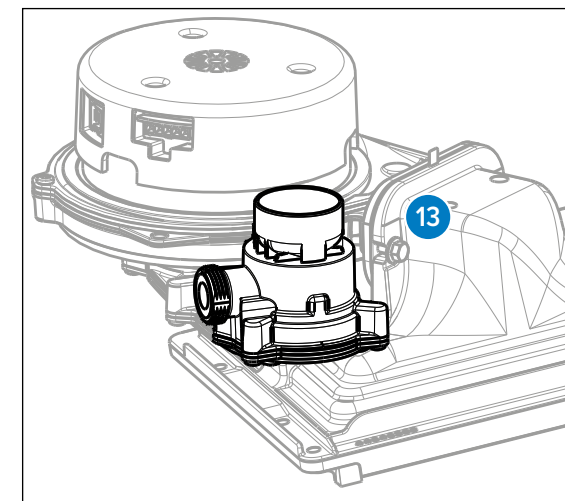


- Replace the gasket (9) between the burner (8) and upper casing (10)
- Replace the gasket (11) between the upper casing (10) and exchanger

- Check the venturi (13) for pollution and clean them with a soft brush in combination with a vacuum cleaner, if necessary

If the inside of the boiler casing is heavily polluted with dust, it is likely that the fan impeller is also polluted.

To clean the fan, it has to be removed from the upper tray and the venturi. Remove the non return valve and clean the impeller with a soft brush and a vacuum cleaner. **Replace the gasket** and take care that the new gasket is installed properly when reassembling the fan parts.



Heat exchanger

- Check the heat exchanger for pollution. Clean it, if necessary, with a soft brush and a vacuum cleaner. Avoid any pollution falling down

! DO NOT TOP FLUSH THE HEAT EXCHANGER WITH WATER.

Reassembly takes place in reverse order.

! DURING INSTALLATION PAY ATTENTION TO THE CORRECT POSITION OF THE CLAMP BARS. THESE HAVE TO BE IN A VERTICAL POSITION.

Note: During routine servicing, and after any maintenance or change of part of the combustion circuit, the following must be checked: -

Checking the CO₂/O₂

Check the CO₂ readings at full load and low load as described on page 22.

Checking flue integrity

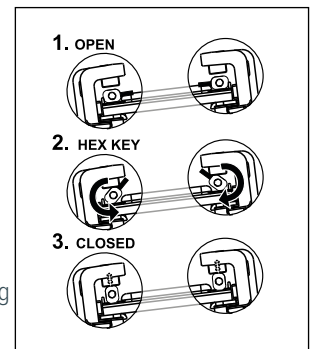
The integrity of the complete flue system and the flue seals by checking air inlet sample to eliminate the possibility of recirculation as described in the Installation & Servicing instructions.

Checking CO readings and Combustion Performance (CO/CO₂ ratio)

Check CO readings and Combustion Performance as described in the installation & servicing instructions.

The combustion reading (CO/CO₂ ratio) must be less than 0.004. If the combustion reading (CO/CO₂ ratio) is greater than this, and the integrity of the complete flue system and combustion circuit seals has been verified, and the inlet gas pressure and gas rate are satisfactory either:-

- Perform the 'Full Service'
- Perform 'Setting the Gas Valve'

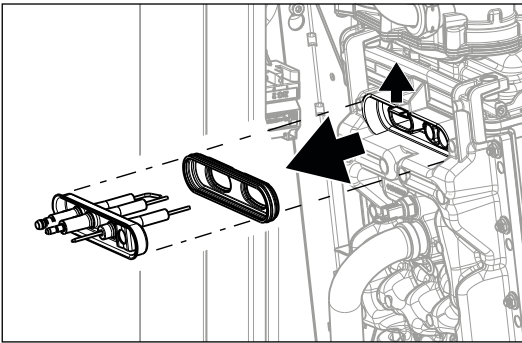


Ignition electrode

Inspect and clean the electrodes and **replace the gasket**. Worn electrodes should be replaced as part of the service.
If the inspection hole is damaged, the entire ignition electrode has to be replaced.
It is replaced as follows:

- Take away the plug connections on the ignition electrode
- Push the clip on top of the electrode upwards and take away the electrode
- Remove and replace the **gasket**

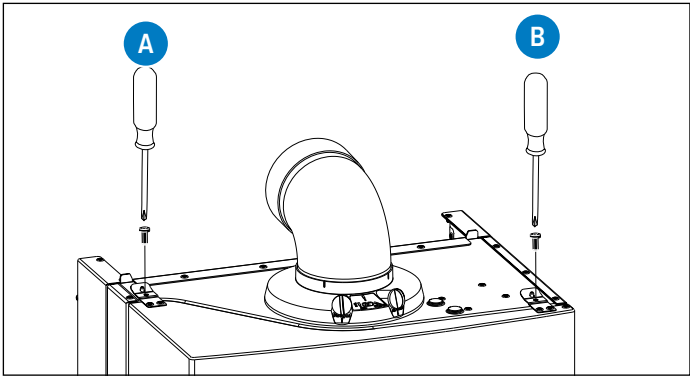
Reassembly takes place in reverse order.



! ALWAYS REPLACE THE GASKETS OF THE REMOVED PARTS DURING MAINTENANCE.

Put the boiler back into operation and carry out a flue gas analysis.

! ALWAYS PUT BACK THE COVER AFTER MAINTENANCE WORK AND SECURE IT WITH SCREWS A AND B.

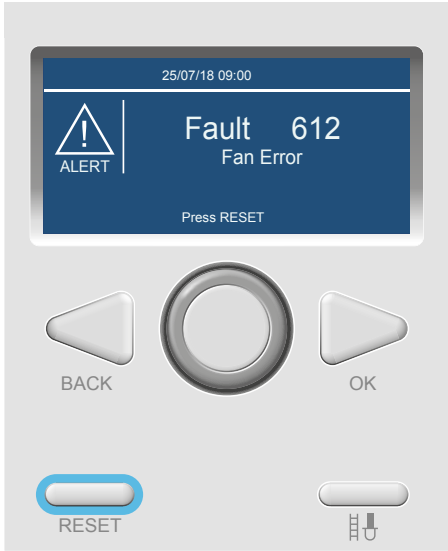


! AFTER SERVICING, COMPLETE THE RELEVANT SERVICE INTERVAL RECORD SECTION OF THE BENCHMARK CHECKLIST LOCATED ON THE INSIDE BACK PAGE OF THE INSTALLATION AND SERVICING INSTRUCTIONS.

Reset a fault code

To Start: Press any button to wake up the screen

- 1 When an error occurs, the fault code and description appears on the screen. To reset the fault code, press the **RESET** button.
- 2 The message on the screen left appears. Press **OK** to reset the error, otherwise the previous screen is shown.
- 3 The Reset in Progress message appears.
- 4 After approximately 10 seconds the **Fault Solved** message appears. After the code is reset, the Home screen appears.



Do you really want to perform the reset? If you press OK button, the reset command will be executed otherwise, by way of ESC, the previous page is shown.

✓ Fault resolved

- 3 The Reset in Progress message appears.

Reset in progress


View error code history

- 1

From the controller Home screen, press the **BACK** and **OK** buttons at the same time for 7 seconds
- 2

Turn the selector wheel to highlight **007** as the Technical Code. Press **OK** to Save.
- 3

The screen below then appears. Turn the selector wheel to highlight **Complete Menu**. Press **OK**. It takes approximately 10 seconds to load the menu.



The Home screen displays a digital display with temperature (60°), pressure (1.5 bar), and mode (ECO/AUTO). Below the display are three buttons: BACK, OK, and a central selector wheel. A RESET button is located at the bottom left.

Insert Code

Insert technical code

007

Save

4

Turn the selector wheel to highlight **8 Service Param**. Press **OK**.

Menu

5 Zone 2 Parameters

6 Zone 3 Parameters

7 < Not Available >

8 Service Param

9 < Not Available >

5

Turn the selector wheel to highlight **8.6 Error History**. Press **OK**.

Technical area

Language, date and time

Complete Menu

Configuration Wizard

Service

Faults

8 Service Param

8.2 Boiler

8.3 Boiler Temperature

8.4 Storage

8.5 Service

8.6 Error History

6

Option **8.6.0 Last 10 Errors** is highlighted. Press **OK**.

8.6 Error History

8.6.0 Last 10 Errors

8.6.1 Reset Error List

7

A survey of the last 10 Errors appears. An example of an error message.

8.6.0 Last 10 Errors

Fault 6

Dynamic Pressure Check Failed

140

10:14 20/08/18

Error codes A detected failure is indicated on the display using error messages. Any blocking error, which includes a P (1P4, 1P9 etc), will only be visible using the Last 10 errors function.

ERROR CODE	ERROR DESCRIPTION	CHECKS
101	Overheat	Temperature rise too fast. Check correct circulation of the water and pump
102	Pressure Sensor Error	Check water pressure on analogue gauge
		Check the sensor
		Check wiring harness not shorting to earth
		Check the connection plug on top of sensor and PCB
104	Flow Check Failed	Check pump is spinning via de-blocking centre screw
		Check PWM pump connection pins, cable and PCB connection CN9
108	Pressure < Pmin (< 0.5 bar), Filling needed	Check water pressure on analogue gauge
1P4	Pressure < Pmin (0.5 - 0.8 bar), Filling needed	Check water pressure on analogue gauge
1P9	Water Pressure Dynamic Check (only applicable if pump feedback turned off)	Check 230V to pump
		Check pump is spinning via de-blocking centre screw
		Check PWM pump connection pins, cable and PCB connection CN9

ERROR CODE	ERROR DESCRIPTION	CHECKS
109	Pressure > Pmax	Check water pressure on analogue gauge
		Take any excess water out of the system
		Check expansion vessel air pressure with boiler drained of water
110	Send Probe Damaged	Check the sensor not short or open circuit
		Check wiring harness connections between sensor & PCB
112	Return Probe Damaged	Check the sensor not short or open circuit
		Check wiring harness connections between sensor & PCB
114	Outdoor Sensor Damaged	Look at parameter 4.2.1 & that the thermoregulation is set right
		Check the sensor
		Check the wiring harness for continuity
		Check wiring harness not shorting to earth
		Check no water leaks affecting wiring harness
		Check connection on PCB are connected properly
140	Dynamic Pressure Check Failed failed (or no pump kick detected - only applicable if pump feedback turned off)	Check 230V to pump
		Check pump is spinning
		Check PWM pump connection pins, cable and PCB connection CN9
141	CH Flow Switch open (iR Boiler)	Flow switch open circuit
		Check water flowing around system
		Check no air lock or air in the system
142	Pump feedback open short circuit	Check boiler for air Check pump operation Use pump LEDs to assist in diagnosis
143	Pump feedback abnormal running	
144	Pump feedback abnormal stop	
145	Pump feedback failure	
201	DHW Probe Damaged (Combi or iS boilers)	Check the sensor
		Check the wiring harness for continuity
		Check wiring harness not shorting to earth
		Check no water leaks affecting wiring harness
		Check connection on PCB are connected properly CN12
		iS boilers should have parameter 2.2.8 - Boiler version, should be set to no.2 Storage with thermostat where no hot water sensor is used
203	Tank Probe Damaged (iS Boilers)	Cylinder sensor faulty
		Check the wiring harness for continuity
		Check wiring harness not shorting to earth
		Check no water leaks affecting wiring harness
		Check connection on PCB are connected properly Yellow plug
303	PCB Fault	Check PCB
304	Too many resets	Too many (> 5) resets in 15 minutes
306	PCB Fault	Check PCB
309	Gas Relay check Failed	Check PCB
3P9	Scheduled Maintenance - Call Service	Scheduled Maintenance - Call Service
41Z	Room sensor z not available	Check for C/htg Zone (X) sensor faulty
501	No flame detected	Check gas supply and flue system correct (in. condensate) Check connection between gas valve and PCB Check connection between spark generator and PCB Check connections between spark generator and electrode Check sensing lead connection between electrode and PCB
502	Flame detected with Gas Valve closed (False flame)	
504	Flame lift	
5P1	1st Ignition Failed	
5P2	2nd Ignition Failed	
5P3	Flame lift	
5P6	No flame	
612	Fan error (fan does not start up)	Check fan and cable
7P1	Pump error: low flow rate.	Ensure system resistance is greater than 370l/h for iCon1 heat exchanger or 400l/h for iCon2 heat exchanger, Check all isolation valves open, Ensure no air or blockages in system, Check pump operation.

Testing the boiler and changing settings

The setting are accessible through a code:

To start: Press any button to way up the screen.

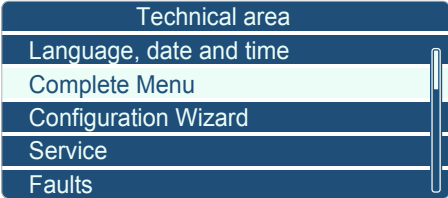
1 From the controller Home screen, press the **BACK** and **OK** buttons at the same time for 7 seconds



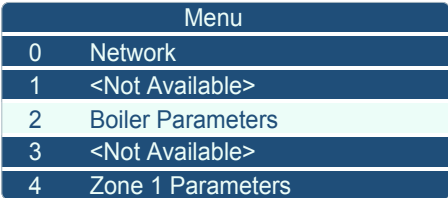
2 Turn the selector wheel to highlight **007** as the Technical Code. Press **OK** to Save.



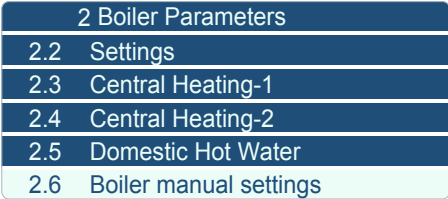
3 The screen below then appears. Turn the selector wheel to highlight **Complete Menu**. Press **OK**. It takes approximately 10 seconds to load the menu.



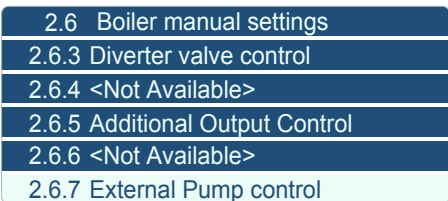
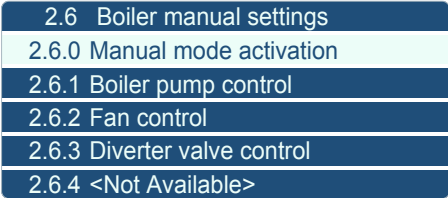
4 Turn the selector wheel to highlight **2 Boiler Parameters**. Press **OK**.



5 Turn the selector wheel to highlight **2.6 Boiler manual setting**. Press **OK**.



6 2.6 Manual settings.



Boiler Manual test setting

Select manual mode activation 2.6.0 and change from 0 = OFF to 1 = ON to enable manual testing mode.

Change parameter 2.6.1 to 2.6.7 component from 0 = OFF to 1 = ON to enable manual testing of the pump, fan, diverter valve, additional output control or external pump control.

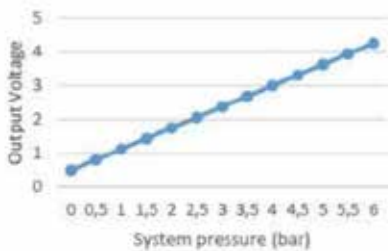
2.6. Boiler manual settings	Name	Description	Range	Default
2.6.0	Manual mode activation	To enable or disable manual mode 0 = OFF 1 = ON	0 - 1	0
2.6.1	Pump Control	0 = OFF 1 = ON	0 - 1	0
2.6.2	Fan Control	0 = OFF 1 = ON	0 - 1	0
2.6.3	Diverter valve control	0 = OFF 1 = ON	0 - 1	0
2.6.5	Additional output control	0 = OFF 1 = ON	0 - 1	0
2.6.7	External Pump	0 = OFF 1 = ON	0 - 1	0

Electrical functions

PLUG	FUNCTION	COMPONENT CONNECTION No.'S	VOLTAGE	RESISTANCE
CN12 (3-5)	Water flow sensor No demand	1 - 2	4.9v DC	
		1 - 3	4.9v DC	
		2 - 3	0v DC	
	Water flow sensor DHW demand	1 - 2	4.9v DC	
		1 - 3	2.5v DC	
		2 - 3	2.3v DC	
R29 (3,4)	Flow sensor T1	1 - 2		10KΩ@ 25°C
R29 (1,2)	Return sensor T2	3 - 4		10KΩ@ 25°C
CN1 (1,2)	External safety contract (link wire)	White		0KΩ
CN1 (3,4)	DHW cylinder sensor	Yellow (DHW)		10KΩ@ 25°C
CN1 (7,8)	OpenTherm BUS & ON / OFF connection	Blue	22v DC	
CN3 (1,2)	ATAG BUS connection	Red	20v DC	
CN3 (5,6)	Outside sensor T4 option	Peach (Out)		1KΩ@ 25°C
CN12 (1,2)	DHW sensor T3			10KΩ@ 25°C

CN12 (6 - 8) Water pressure sensor P1 (@ + 1.0bar)

7 – 8 voltages based on pressure – see table



CN2 (5,6,7,9)	Actuator 3 way valve		DHW on	CH on
		1 - 2	230v AC	0v AC
		1 - 3	0v AC	169v AC
		1 - 4	0v AC	0v AC
		2 - 3	230v AC	230v AC
		2 - 4	0v AC	230v AC
		3 - 4	0v AC	0v AC
CN12 (1, 5)	Fan			
CN2 (1, 2)	Gas valve	1 - 2	230v AC	
CN2 (3, 4)	Spark generator (ignition)	4	230v AC	

Resistance table sensors

RESISTANCE TABLE SENSORS			
Outside Sensor		Flow Sensor, Return Sensor, DHW Sensor	
NTC 1k (25°C)		NTC 10k (25°C)	
Temperature (°C)	Resistance (KΩ)	Temperature (°C)	Resistance (KΩ)
-10	4.574	-10	55.047
-9	4.358	0	32.555
-8	4.152	10	19.873
-7	3.958	12	18.069
-6	3.774	14	16.447
-5	3.600	16	14.988
-4	3.435	18	13.674
-3	3.279	20	12.488
-2	3.131	22	11.417
-1	2.990	24	10.449
0	2.857	26	9.573
1	2.730	28	8.779
2	2.610	30	8.059
3	2.496	32	7.406
4	2.387	34	6.811
5	2.284	36	6.271
6	2.186	38	5.779
7	2.093	40	5.330
8	2.004	42	4.921
9	1.920	44	4.547
10	1.840	46	4.205
11	1.763	48	3.892
12	1.690	50	3.605
13	1.621	52	3.343
14	1.555	54	3.102
15	1.492	56	2.880
16	1.433	58	2.677
17	1.375	60	2.490
18	1.320	62	2.318
19	1.268	64	2.159
20	1.218	66	2.013
21	1.170	68	1.878
22	1.125	70	1.753
23	1.081	72	1.638
24	1.040	74	1.531
25	1.000	76	1.433
26	0.962	78	1.341
27	0.926	80	1.256
28	0.892	82	1.178
29	0.858	84	1.105
30	0.827	86	1.037
35	0.687	88	0.974
40	0.575	90	0.915

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